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FEDERAL - STATE - PRIVATE
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**SNOW SURVEY and WATER SUPPLY FORECASTS
for
MONTANA & NORTHERN WYOMING**

UNITED STATES DEPARTMENT of AGRICULTURE--SOIL CONSERVATION SERVICE,
and
MONTANA AGRICULTURAL EXPERIMENT STATION

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Data included in this report were obtained by the agencies named above in cooperation with the Bureau of Reclamation, U.S. Forest Service, U.S. Geological Survey, National Park Service, State Engineers of Montana and Wyoming and other Federal, State, and private organizations.

AS OF
APR. 1, 1960

UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

TO RECIPIENTS OF COOPERATIVE SNOW SURVEY AND WATER SUPPLY FORECAST REPORTS:

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Fortunately, most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, so does the runoff of the streams. The best seasonal management of variable western water supplies results from fore-knowledge of the runoff.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, about 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1400 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

By relating snow survey measurements taken over a period of years to spring-summer runoff during the same period, relationships have been developed which make it possible to forecast seasonal runoff several months in advance of occurrence. In order to make a forecast, once a forecast relationship has been developed, the maximum snow water content at previously selected key snow courses is usually entered in the forecast relationship. More accurate forecasts are often obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast relationships.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions.

PUBLISHED BY SOIL CONSERVATION SERVICE

<u>REPORTS</u>	<u>ISSUED</u>	<u>LOCATION</u>	<u>COOPERATING WITH</u>
RIVER BASINS			
COLORADO AND STATE OF UTAH	MONTHLY (JAN.-MAY)	SALT LAKE CITY, UTAH	UTAH STATE ENGINEER AND OTHER AGENCIES
COLUMBIA AND STATES OF IDAHO AND ALASKA	MONTHLY (JAN.-MAY)	BOISE, IDAHO	IDAHO STATE RECLAMATION ENGINEER
UPPER MISSOURI AND STATE OF MONTANA	MONTHLY (FEB.-MAY)	BOZEMAN, MONTANA	MONT. AGR. EXP. STATION
WEST-WIDE	OCT. 1, APR. 1, MAY 1	PORTLAND, OREGON	ALL COOPERATORS
STATES			
ARIZONA	SEMI-MONTHLY (JAN. 15 - APR. 1)	PHOENIX, ARIZONA	SALT R. VALLEY WATER USERS ASSOCIATION ARIZ. AGR. EXP. STATION
COLORADO AND NEW MEXICO	MONTHLY (FEB.-MAY)	FORT COLLINS, COLORADO	COLO. AGR. EXP. STATION COLO. STATE ENGINEER N. MEX. STATE ENGINEER
NEVADA	MONTHLY (FEB.-APR.)	RENO, NEVADA	NEVADA DEPT. OF CONSERVATION AND NATURAL RESOURCES DIVISION OF WATER RESOURCES
OREGON	MONTHLY (JAN.-MAY)	PORTLAND, OREGON	ORE. AGR. EXP. STATION OREGON STATE ENGINEER
WASHINGTON	MONTHLY (FEB.-MAY)	SPOKANE, WASHINGTON	WASH. STATE DEPT. OF CONSERVATION
WYOMING	MONTHLY (FEB.-JUNE)	CASPER, WYOMING	WYOMING STATE ENGINEER

Copies of these various reports may be secured from: Head, Water Supply Forecasting Section
Soil Conservation Service
209 S. W. Fifth Ave., Portland 4, Oregon

PUBLISHED BY OTHER AGENCIES

<u>REPORT</u>	<u>ISSUED</u>	<u>AGENCY</u>
BRITISH COLUMBIA	MONTHLY (FEB.-JUNE)	COMPTROLLER, WATER RIGHTS BR., DEPT. OF LANDS AND FORESTS, PARLIAMENT BLDG., VICTORIA, B.C., CANADA
CALIFORNIA	MONTHLY (FEB.-MAY)	CALIFORNIA DEPT. OF WATER RESOURCES, SACRAMENTO, CALIFORNIA



FEDERAL-STATE-PRIVATE COOPERATIVE
SNOW SURVEYS and WATER SUPPLY FORECASTS
for
MONTANA AND NORTHERN WYOMING
(Upper Missouri and Upper Columbia River Basins)

Report Prepared By:

A. R. Codd
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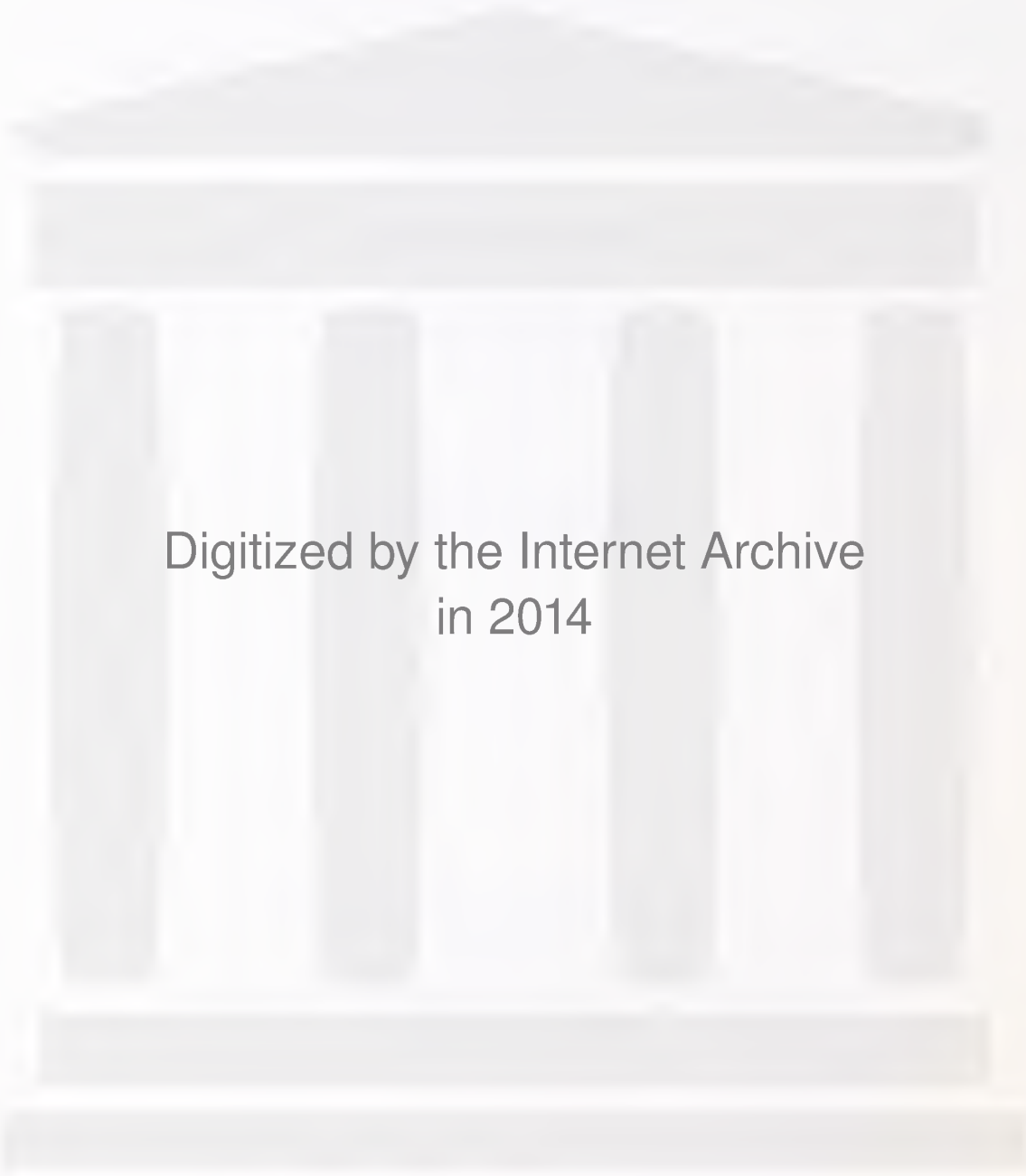
U. S. Department of Agriculture
Soil Conservation Service
and
Montana Agricultural Experiment Station
Bozeman, Montana

Report Issued By:

H. D. Hurd
State Conservationist
of Montana

O. W. Monson
Irrigation Engineer
Montana Agricultural
Experiment Station

R. E. Huffman
Director
Montana Agricultural
Experiment Station



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MONTANA WATER SUPPLY OUTLOOK
as of
April 1, 1960

Statewide, the 1960 Water Supply Outlook for Montana is only FAIR. Exceptionally warm weather during the last two weeks of March removed most of the low elevation snow. This warm spell ripened the high elevation snow-pack for an early spring runoff. A cool May could retard the runoff to some extent.

High base flow in the streams during the winter and an above normal fall precipitation raised the forecasts that would otherwise be much lower.

Soil moisture throughout the State is exceptionally high for April first.

The Jefferson River is forecast at 91 percent average, with most of the water to come from the Big Hole River. The Madison River is forecast at 71 percent average and the Gallatin River is forecast at 74 percent average. Combined, these major streams will make close to 80 percent average flow down the Missouri River.

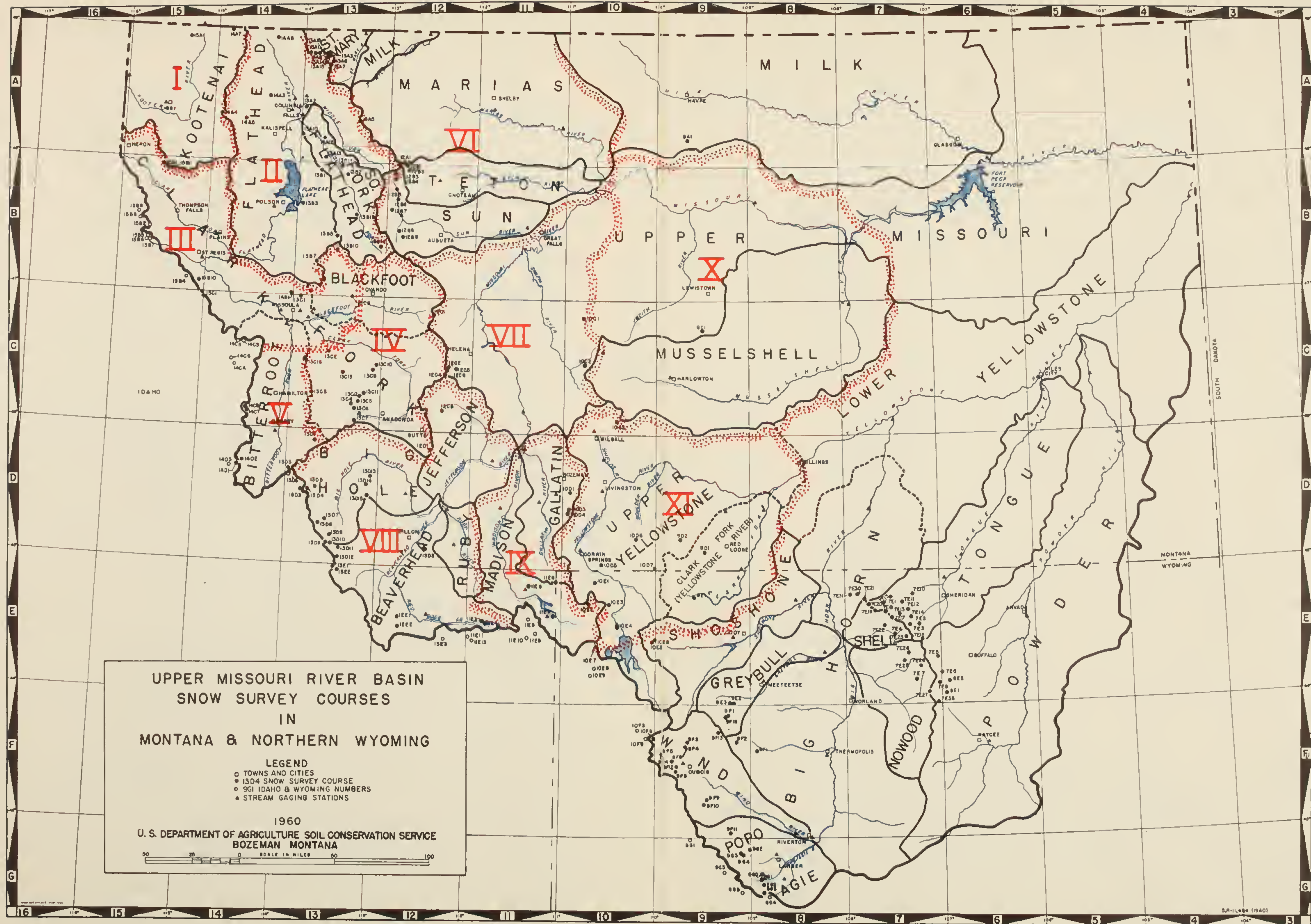
The Columbia River basin in Montana is covered with only a FAIR snow-pack--75 percent average. The South Fork of the Flathead River, below Hungry Horse Dam, is forecast at 79 percent average. The Flathead River at Columbia Falls is forecast to flow 1,819,000 acre feet during the April-September period, or 79 percent average. This is 40 percent LESS than last year. The Clark Fork River at Whitehorse Rapids, near Cabinet, is forecast to flow 10,676,000 acre feet of water during the April-September period. This figure is 77 percent average.

INDEX TO MONTANA & NORTHERN WYOMING SNOW COURSES

Location									Location									Location								
Drainage Basin and Course Name	Montana Number	Elev.	Sec. Lat.	Twp.	Range Long.	Record Began	Measuring Dates	Measured By	Drainage Basin and Course Name	Montana Number	Elev.	Sec. Lat.	Twp.	Range Long.	Record Began	Measuring Dates	Measured By	Drainage Basin and Course Name	Montana Number	Elev.	Sec. Lat.	Twp.	Range Long.	Record Began	Measuring Dates	Measured By
MISSOURI RIVER DRAINAGE									MISSOURI RIVER DRAINAGE (cont.)									MISSOURI RIVER DRAINAGE (cont.)								
(ROCK-S-AVEHEAD)									(UPPER YELLOWSTONE)									(TONGUE RIVER cont.)								
Lakeview Ridge	11E3	7400	27	14S	2W	1948	3,4,5	10	Camp Senia Canyon	901	7890	2	8S	18E	1937	4	1	Horse Trail Div.	7E19	9200	25	55N	90W	1956	2,3,4,5	1
Lakeview Canyon	11E2	6930	26	14S	2W	1948	3,4,5	10		10E3	7750	44°-44'		110°-30'	1938	1,2,3,4,5	6	Lake Geneva	7E16	9000	7	52N	86W	1956	2,3,4,5	1
Limekiln	12E2	6950	5	15S	9W	1948	3,4	1	Cooke City	1007	7400	25	9S	14E	1937	1,2,3,4,5	6	North Tongue	7E15	8800	17	55N	89W	1956	2,3,4,5	1
White Pine Ridge	12E1	8850	18	14S	9W	1948	3,4	1	Crevise Mt.	1005	8400	22	9S	9E	1935	3,4	2	Sibley Lake	7E11	8000	10	55N	88W	1956	2,3,4,5	1
(HORN & MURRIE)									(SHIELDS RIVER)									(POWDER RIVER) Wyoming								
Bloody Dick	13D10	7600	12	8S	14W	1948	3,4	1	Porcupine	10C3	6500	10	4N	10E	1938	3,4	1	Crazy Woman	6E2	6200	6	47N	84N	1956	2,3,4,5	1
Gold Stone	13D9	8100	11	8S	16W	1948	3,4	1										Muddy Creek O.S.	6E1	7800	2	48N	84N	1956	2,3,4,5	1
Lemna Pass	13E1	7460	9	10S	15W	1948	3,4	1										Munkers Pass	7E8	9700	11	48N	85W	1950	2,3,4,5	1
Terrell Creek	13U12	6650	14	9S	15W	1948	3,4	1										North Powder #2	7E36	8300	20	47N	85W	1956	2,3,4,5	1
Trail Creek	13E2	7090	15	10S	15W	1948	3,4	1										Onion Gulch	7E27	8100	31	46N	85W	1956	2,3,4,5	1
Jelway Junction	13U11	6800	27	8S	15W	1948	3,4	1										Soldier Park	7E5	8700	36	51N	85W	1950	2,3,4,5	1
(BIG HOLE)									(WIND RIVER) Wyoming									(COLUMBIA RIVER BASIN)								
Big Hole Pass	13U3	7240	28	3S	18W	1948	3,4	1	Big Warm	9F12	8800	36	42N	109W	1955	2,3,4,5	1									
Big Hole Pass-Se.	13U4	6900	24	3S	17W	1948	3,4	1	Brooks Lake #3	10P8	9200	23	44N	110W	1939	2,3,4,5	1									
East Boundary	13U5	6700	22	3S	17W	1948	3,4	1	Burreughs Creek	9F4	8800	15	44N	107W	1948	2,3,4,5	1									
Gibbons Pass	1302	7100	4	2S	19W	1934	1,2,3,4,5	1,3	Dinwoodie	9F10	10000	21	39N	105W	1948	2,3,4,5	1									
Jahnuke Creek	1308	7340	25	7S	16W	1948	3,4	1	Dry Creek	9F9	9500	34	4N	6W	1948	2,3,4,5	1									
Miner Forks	13U6	7300	24	6S	17W	1948	3,4	1	DuNoir	9F6	8750	27	42N	108W	1940	2,3,4,5	1									
Miner Lake	13D7	6720	10	6S	16W	1948	3,4,5	1	East Fork Geyser Creek	9F13	9200	23	44N	104W	1956	2,3,4,5	1	Baree Creek	15B11	5500	6	25N	30W	1956	4,5,5A	2
(WISE RIVER)									(SHERIDAN RIVER)									(POWDER RIVER) Wyoming								
Anderson Mdw.	13D14	7000	18	3S	12W	1948	3,4	1	Sheridan R.S. #1	9F5	7500	3	42N	109W	1939	2,3,4,5	1	Baree Mountain	15B1	6000	1	25N	31W	1937	4,5,5A	2
Elk Horn	13U15	8450	15	4S	12W	1935	3,4,5	3	Sheridan R.S. #2	9F14	7500	3	42N	109W	1955	2,3,4,5	1	Red Mountain	15A1	6000	4	36N	29W	1937	3,4,5,5A	1,2
Wise River	13U13	6300	15	2S	12W	1948	3,4	1	T-Cress Ranch	9F3	8000	1	43N	107W	1940	2,3,4,5	1	Weasel Divide	14A7	5450	8	37N	24W	1955	4,5,5A	1,2
(RUBY RIVER)									(POPO AGUE RIVER) Wyoming									(FLATHEAD RIVER)								
Flashlight	12D3	6950	22	8S	7W	1945	3,4,5	1	Togwotee Pass	10P9	9600	29	44N	110W	1936	2,3,4,5	11	Basin Creek	13B11A	5000	11	19N	12W	1951	2,3,4,5	2
MADISON RIVER									(BLUE RIDGE)									(BIG CREEK)								
Hebgen	11E5	6550	22	11S	3E	1934	1,2,3,4,5	3	Blue Ridge	802	9500	23	31N	101W	1939	2,3,4,5	1	Big Creek	13B3	6750	6A7	22N	18W	1941	3,4,5	5
West Yellowstone	11E7	6700	34	13S	5E	1934	1,2,3,4,5	3	Bruce's Camp	805	6500	24	32N	101W	1955	2,3,4	1	Brush Creek	14A4	5000	13	30N	26W	1937	3,4,5	1,2
Norris Basin	10E2	7500	44°44'		110°-42'	1936	3,4	6	Nobb's Park	9G3	10000	22	2S	3W	1948	2,3,4,5	1	Cattle Queen	13A1	4700	7	35N	17W	1939	3,4,5	6
GALLATIN RIVER									(MOSQUITO PARK R.S.)									(DEERET MOUNTAIN)								
Devil's Slide	10U4	8100	14	5S	6E	1935	2,3,4,5	2,1	Sawmill Glade	8G1	8500	3	31N	101W	1939	2,3,4,5	1	Nell Roaring Div.	14A3	5770	35	32N	22W	1942	3,4,5	1,2
Hood Meadow	10U3	6600	22	4S	6E	1935	2,3,4,5	2,1	South Pass	8G3	9000	13	30N	101W	1939	2,3,4,5	1	Nolbrook	13B13A	4530	18	21N	13W	1951	1,2,3,4,5	2
New World	10U1	6700	24	3S	6E	1939	1,2,3,4,5	7	St. Lawrence	9F11	9000	26	1N	4W	1940	2,3,4,5	1	Kiehenehn	14A6	3886	14	37N	22W	1954	4,5	6
21-Mile	11E6	7150	1	11S	5E	1934	1,2,3,4,5	3	Trout Creek	9G2	8400	5	2S	2W	1948	2,3,4,5	1	Logan Creek	14A5	4300	34	30N	24W	1937	3,4,5	2
MISSOURI RIVER MAIN STEM									(OWL CREEK) Wyoming									(MARIAS PASS)								
Chessman Reservoir	12C5	6200	2	8N	5W	1936	1,2,3,4,5	3	Beaver Mill	9F2	8900	6	43N	102W	1948	2,3,4,5	1	Marias Pass	13A5M	5250	34	30N	14W	1934	1,2,3,4,5	3
Crystal Lake	9C1	6100	19	12N	18E	1941	3,4	1,2	Owl Creek	8F1	8700	36	43N	101W	1948	2,3,4,5	1	Trinkus Lake	13B1	6500	9	25N	17W	1948	3,4,5	2
Crashhopper	10C2	7000	19	9N	8E	1938	3,4	2										Trout Lake	13A12M	3600	21	28N	17W	1948	3,4,5	1,2
Kings Hill	10C1	7950	35	13N	7E	1934	3,4,5	3	(GREYBULL RIVER) Wyoming									Twin Creeks	13B11	3580	14	26N	16W	1951	2,3,4,5	1,2
Plentic Grounds	12C6	6500	10	5N	6W	1941	2,3,4,5	4	Timber Creek #1	9E2	8800	25-	47N	103W	1948	2,3,4,5	1	Upper Holland Lk.	13B5	7000	28	20N	16W	1948	3,4,5	2
Pipestone Pass	12D1	7200	10	1N	7W	1938	2,3,4,5	1	Timber Creek #2	9E3	8800	25	47N	103W	1955	2,3,4,5	1	CLARK FORK								
Stemple Pass	12C1	6900	16	13N	7W	1934	3,4,5	3	Wood River #1	9F1	8000	28	46N	103W	1939	2,3,4,5	1	Baree Creek	15B11	5500	6	25N	30W	1956	4,5,5A	2
Ten Mile Creek L	12C2	6250	13	8N	6W	1935	1,2,3,4,5	3	Wood River #2	9F15	8000	28	46N	103W	1956	2,3,4,5	1	Baree Mountain	15B1	6000	1	25N	31W	1937	4,5,5A	2
Ten Mile Creek M	12C3	6800	13	8N	6W	1934	1,2,3,4,5	3										Black Pine	13C13	7100	25	8N	15W	1960	3,4,5	1
Ten Mile Creek U	12C4	8000	19	8N	5W	1935	1,2,3,4,5	3	(SHOSHONE RIVER) Wyoming									Coyote Hill	13910	4200	12	18N	16W	1952	1,2,3,4,5	2
(TETON RIVER)									(SILVAN PASS)									(EL DORADO MINE)								
Freight Creek	12A1	6000	13	26N	10W	1948	3,4	1	East Entrance	10E6	7000	17	52N	109W	1948	1,2,3,4,5	6	Fred Burr Pass	13C11	8000	12	6N	13W	1957	3,4,5	1
Waldron Creek	12B2	5600	16	25N	9W	1948	3,4	1	Sylvan Pass	10E5	7100	12	52N	110W	1936	1,2,3,4,5	6	Freezeout Summit	15B10	6800	21	15N	27W	1937	4,5	2
West Fork	12B1	6000	6	25N	9W	1948	3,4	1	(NOWOOD CREEK) Wyoming									Gold Creek Lk.	13C10	7200	14	8N	12W	1949	4	1
(SUN RIVER)									(COLD SPRINGS CAMP)									(HOODOO CREEK)								
Benchmark	12B8	5500	9	20N	10W	1948	3,4	1	Cold Springs Camp	7E25	8700	1	50N	88W	1956	2,3,4,5	1	Intergaard	13C4	6450	6	5N	13W	1936	2,3,4	4
Cabin Creek	12B6	5400	33	23N	10W	1948	3,4	1,2	Medicine Lodge Lks	7E24	9500	7	51N	87W	1956	2,3,4,5	1	Lubrecht Forest #6	13C8	4400	11	44N	15W	1951	1,2,3,4,5	12
5-Bull	12B9	5600	36	20N	10W	1948	3,4	1,2	Munkers Pass	7E8	9700	11	48N	85W	1950	2,3,4,5	1	North Fork Jocko	13B7	6330	3	17N	17W	1941	3,4,5	5
Oates Park	12B5	5300	31	24N	10W	1949	3,4	1,2	North Powder	7E36	8300	20	47N	85W	1956	2,3,4,5	1	Pipestone Pass	12D1	7200	10	1N	7W	1938	2,3,4,5	1
Goat Mountain	12B7	7000	20	22N	10W	1949	3,4	3	Onion Gulch	7E27	8100	31	48N	85W	1956	2,3,4,5	1	Red Lion	13C12	7000	27	6N	13W	1958	3,4,5	1
Wrong Ridge	12B3	6800	17	25N	10W	1949	3,4	1,2	Tensleep Lake	7E26	9075	33	50N	86W	1956	2,3,4,5	1	Slide Rock Mt.	13C7	7100	35	10N	16W	1937	4	1
Wrong Creek	12B4	5700	32	25N	10W	1949	3,4	1,2	Tensleep R.S.	7E7	8300	30	49N	86W	1935	2,3,4,5	1	Southern Cress	13C5	6500	8	5N	13W	1936	2,3,4	4
(MARIAS RIVER)									(TYRRELL R.S.)									(STORM LAKE)								
Marias Pass	13A5M	5250	34	30N	14W	1934	1,2,3,4,5	3	Tyrrell R.S.	7E35	8300	30	49N	86W	1956	2,3,4,5	1	Stemple Pass	12C1	6900	16	13N	7W	1934	3,4,5	3
(MILK RIVER)									(SHELL CREEK) Wyoming									(STUART MILL)								
Rocky Boy	9A1	5200	15	28N	16E	1941	3,4	7	Bald Mountain	7E21	9600	33	56N	91W	1956	2,3,4,5	1	Storm Lake	13C7	7780	19	4N	13W	1939	2,3,4	1
(MUSSELSHELL RIVER)									(BEAVER-TONGUE DIV.)									(STUART MOUNTAIN)								
Crashhopper	10C2	7000	19	9N	8E	1938	3,4	2	Beaver-Tongue Div.	7E20	9200	12	55N	91W	1956	2,3,4,5	1	TV Mountain	14B1	6800	33	15N	19W	1956	1,2,3,4,5	1
									(BONE-SPRING DIV.)									(RITTEPPOOT RIVER)								
									Bone-Spring Div.									Ambrose								
									Granite Creek Camp									East Fork P.S.								
									Granite Pass									Gibbons Pass								
									Norris-Trail Div.									Iolo Pass.								
									Ranger Creek									Lost Horse								
									Shell Creek									Mez Perce Camp								
																		Mez Perce Pass								
																		Powell R.S.								
																		Skalkaho Summit								
																		Twin Lakes								

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COMPARISON OF SNOW COVER WITH THAT OF PREVIOUS YEARS

Summary of Snow-Survey Data by Tributary Watersheds April 1, 1960

TRIBUTARY WATERSHED	No. of Courses Averaged	No. Years Used	1960 Snow Water Equivalent Expressed as Percent of	
			1959	Average
<u>COLUMBIA RIVER BASIN IN MONTANA</u>				
Kootenai above Libby	14	7-15	73	74
Flathead	21	7-15	71	87
Lower Clark Fork	9	7-15	68	74
Upper Clark Fork	15	6-15	63	66
Bitterroot	9	14-15	72	66

MISSOURI RIVER BASIN IN MONTANA

Marias, Teton & Sun	11	9-15	47	50
Missouri Main Stem	7	14-15	63	74
Beaverhead-Jefferson	31	10-15	72	63
Madison-Gallatin	10	12-15	68	62
Judith-Musselshell	5	15	74	86
Upper Yellowstone	16	9-15	63	65

AVAILABLE SOIL MOISTURE
as of
April 1, 1960

Drainage Basin and Station	Station No.	Elev.	Soil Profile in Inches		Date	Soil Moisture Content in Inches About 4/1/60				Y r s
			Depth	Cap.		1960	1959	1958	Avg.	
<u>GALLATIN</u>										
College Site	11D2M	4856	54	14.5	4/1	12.6	11.6	8.2	9.6	3
<u>FLATHEAD</u>										
Marias Pass	13A5M	5250	54	8.4	3/26	6.6	6.7	5.7	6.2	6
Spotted Bear R.S.	13B15M	3700	28	5.9	3/29	5.3	5.3	5.1	5.4	3
Trout Lake	13A12M	3600	54	11.8	3/28	12.5	12.0	12.5	12.4	3

AVAILABLE SOIL MOISTURE
as of
October 1, 1959

						1959	1958	1957	Avg.	
<u>GALLATIN</u>										
College Site	11D2M	4856	54	14.5	10/2	8.6	6.8	4.4	5.8	4
<u>FLATHEAD</u>										
Marias Pass	13A5M	5250	54	8.4	10/1	5.6	4.5	3.4	4.5	5
Spotted Bear R.S.	13B15M	3700	28	5.9	9/29	4.3	3.7	1.2	2.7	3
Trout Lake	13A12M	3600	54	11.8	9/29	9.8	10.5	2.1	7.2	3

WATER SUPPLY OUTLOOK

KOOTENAI RIVER BASIN

MONTANA

AS OF :

APRIL 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

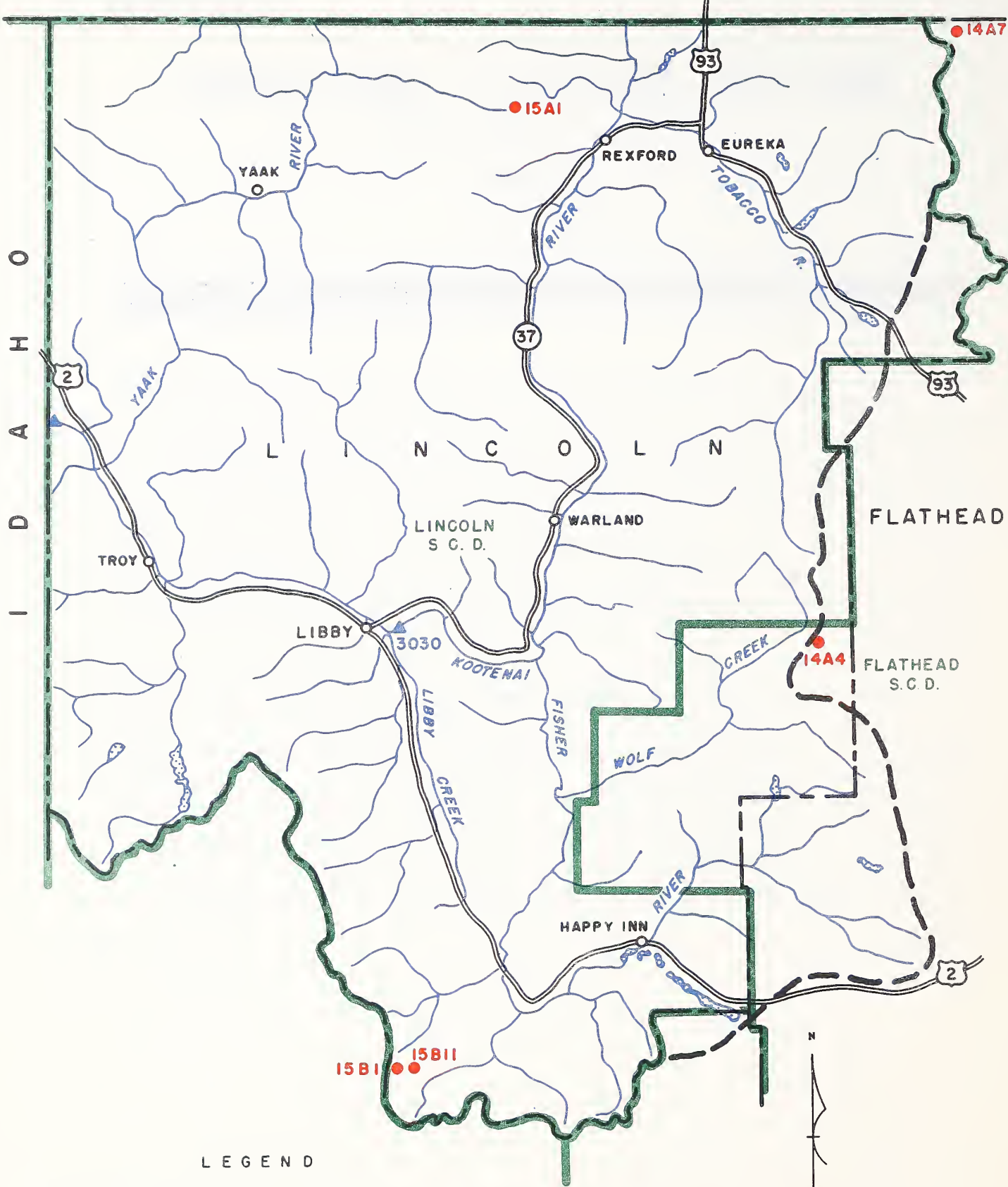
Snow Survey measurements made on or about April first in the Kootenai River basin indicate the water stored in the snow-pack is less than was measured on or about March first at a majority of the snow courses. Water content as of April first at snow courses in the Kootenai basin is 73 percent of last year and 74 percent of the 1943-57 average.

Stream flow for the Kootenai River basin is forecast to be about 10 percent less than average. April through September runoff at Libby is forecast at 6,896,000 acre feet. Tributary streams in the northern portion of the drainage should flow 10 to 15 percent below average; those in the southern portion should flow about 25 percent below average.

Report Prepared by _____

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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



LEGEND

- 13 E 2 SNOW SURVEY COURSE
- ▲ 12 D 2 M SOIL MOISTURE STATION
- ⊥ 13 B 3 A AERIAL MARKER AT SNOW COURSE
- ▲ 0125 STREAM GAGING STATION
- DRAINAGE
- S. C. D. BOUNDARY
- WATERSHED BOUNDARY
- == HIGHWAY
- TOWN
- COUNTY BOUNDARY
- STATE BOUNDARY



SCALE 10 5 0 10 MILES

WATER SUPPLY FORECASTS

AS OF APRIL 1, 1960 - WATERSHED I

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	%	MEASURED +	
NO.	NAME				LAST YEAR	NORMAL
3030	KOOTENAI RIVER Libby (at)	Apr-Sept Apr-July	6896 5958	89 89	9820 8088	7722 6694
3050	Leonia (at)	Apr-Sept Apr-July	8300 8520	93 93	10969 9162	8907 7818
(+) Provisional data furnished by U. S. Geological Survey.						

RESERVOIR STORAGE DATA

AS OF

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

SNOW SURVEY DATA

AS OF APRIL 1, 1960

WATERSHED I

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
15B11	Baree Creek	5500	4/1	106	36.7	57.2	-	-
15B1	Baree Mountain	6000	4/1	104	36.0	54.3	46.4	15
14A4	Brush Creek	5000	3/24	35	11.1	14.8	15.2	9
Can 10	Fernie	3500	4/1	17	4.3	8.4	8.4	15
Can 12A	Field	4200	3/30	11	3.4	8.1	5.2	15
Can 43	Gray Creek	5100	3/26	53	17.1	18.7	20.6	10
Can 33	Kicking Horse	5400	3/31	40	11.2	17.6	15.0	11
Can 20B	Kimberley	3800	3/31	15	4.4	6.7	6.8	15
Can 32	Marble Canyon	5000	3/30	38	7.1	13.5	14.9	11
Can 10A	New Fernie	4100	4/1	36	9.4	15.2	16.6	7
15A1	Red Mountain	6000	3/22	56	18.2	20.2	21.5	15
Can 8A	Sinclair Pass	4500	3/30	18	4.1	4.7	6.0	15
Can 20A	Sullivan Mine	5100	3/31	41	12.2	14.6	16.0	12
Can 41	Upper Elk River	4400	3/30	13	3.1	7.7	9.3	10
14A7	Weasel Divide	5450	3/23	87	31.5	33.9	33.4	15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

WATER SUPPLY OUTLOOK

FLATHEAD RIVER BASIN

MONTANA

AS OF :

APRIL 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

Snow Surveys made in the Flathead River basin on or about the first of April indicate the water stored in the snow-pack is about 30 percent below that of April first last year and 87 percent of the 1943-57 average.

Streamflow in the drainage is forecast at about 10 to 20 percent below average. The South Fork of the Flathead near Columbia Falls is expected to flow 1,819,000 acre feet during the April through September period. This is about 40 percent less than last year. The North Fork of the Flathead should flow about 25 percent less than last year, with the Middle Fork of the Flathead producing 65 percent of last year's flow.

Ungaged tributary streams in the basin should flow 60 to 70 percent of last year.

Reservoir storage is above average in both power and irrigation reservoirs.

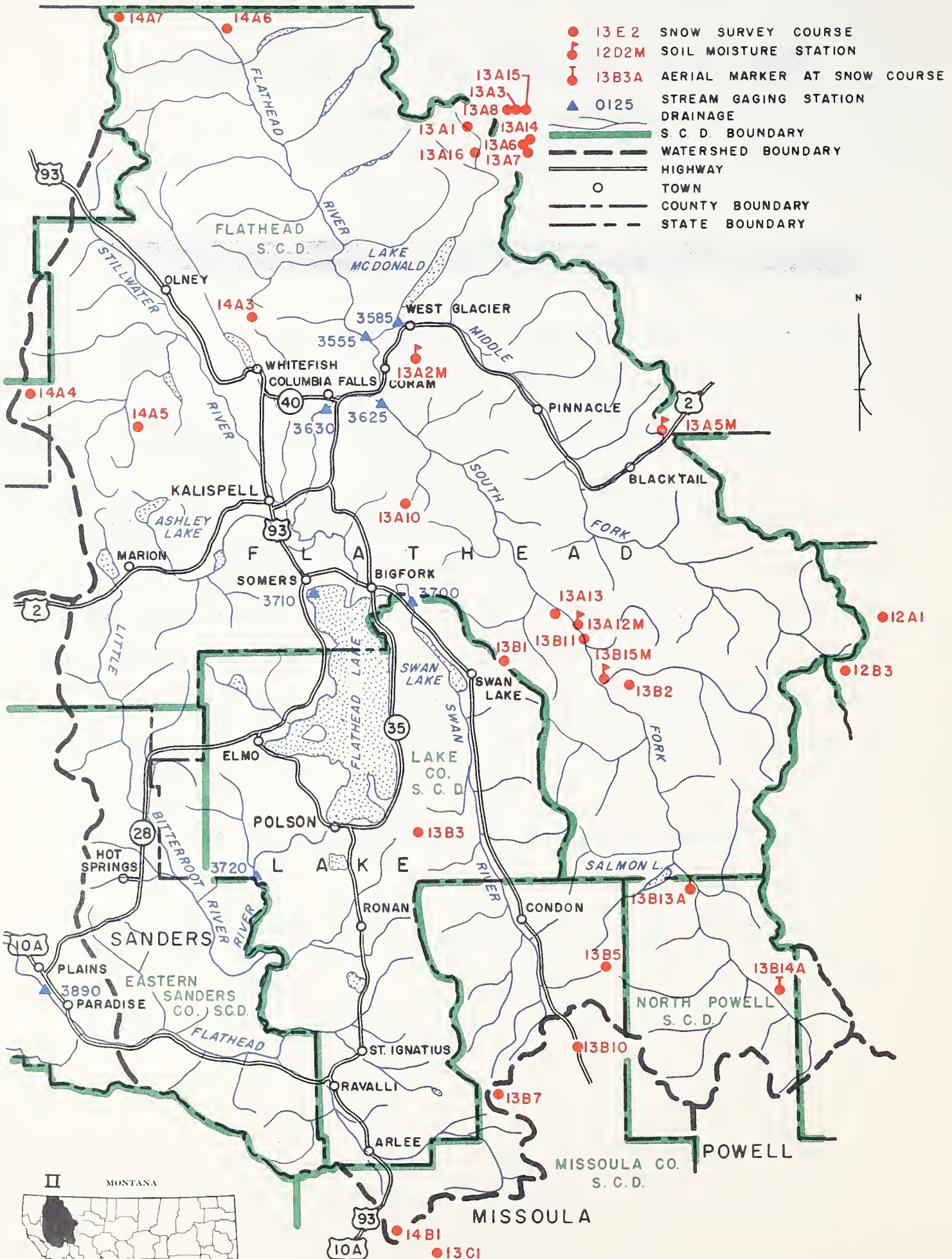
Report Prepared by

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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

- 13 E 2 SNOW SURVEY COURSE
- 12D2M SOIL MOISTURE STATION
- 13B3A AERIAL MARKER AT SNOW COURSE
- ▲ 0125 STREAM GAGING STATION
- DRAINAGE
- S. C. D. BOUNDARY
- WATERSHED BOUNDARY
- HIGHWAY
- TOWN
- COUNTY BOUNDARY
- STATE BOUNDARY

N



SCALE 10 0 10 20 30 40 MILES

WATER SUPPLY FORECASTS

AS OF APRIL 1, 1960 - WATERSHED II

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	%	MEASURED +	
NO.	NAME				LAST YEAR	NORMAL
3555	NORTH FORK FLATHEAD RIVER Columbia Falls (near)	Apr-Sept Apr-July Apr-June	1679 1553 1312	86 88 88	2378 2103 1766	1942 1769 1491
3585	MIDDLE FORK FLATHEAD RIVER West Glacier (near)	Apr-Sept Apr-July Apr-June	1514 1411 1200	80 81 81	2361 2156 1796	1881 1747 1480
3625	SOUTH FORK FLATHEAD RIVER Columbia Falls (nr)(17)	Apr-Sept Apr-July Apr-June	1819 1755 1520	79 80 80	3166 2955 2515	2297 2180 1900
3630	FLATHEAD RIVER Columbia Falls (at)(17)	Apr-Sept Apr-July Apr-June	5148 4793 4109	82 82 82	7921 7249 6071	6299 5845 4993
3720	Polson (near) (18)	Apr-Sept Apr-July Apr-June	6089 5716 4868	82 82 82	9801 8906 7464	7462 6939 5897
3700	SWAN RIVER Big Fork (near)	Apr-Sept Apr-July Apr-June	577 521 414	90 92 90	997 864 672	641 568 460
(17) Observed flow plus change in storage in Hungry Horse Reservoir.						
(18) Observed flow plus change in storage in Hungry Horse Reservoir and Flathead Lake.						
(+) Provisional data furnished by U. S. Geological Survey.						

RESERVOIR STORAGE DATA

AS OF MARCH 31, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
3620	Hungry Horse	3428.0	2841.0	2286.0	2022.0
3710	Flathead	1791.0	867.8	883.4	628.8
3757	Camas	42.8	37.3	28.9	26.5
3800	Mission Valley	98.6	53.0	34.2	38.6
3805	Lower Jocko Lake	7.6	1.4	Snowbound	

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

SNOW SURVEY DATA

AS OF APRIL 1, 1960

WATERSHED II

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
13B14A	Basin Creek	5000	4/3	10	6.2	9.1	10.0	7
14B3	Bassoo Creek	4400	3/16	38	10.0	-	-	-
13B3	Big Creek	6750	3/30	111	45.8	60.8	43.4	15
14A4	Brush Creek	5000	3/24	35	11.1	14.8	15.2	9
13A1	Cattle Queen	4700	4/2	74	27.7	34.4 ^E	34.4	15
13A2M	Desert Mountain	5600	3/25	46	15.9	17.6	16.6	15
Can 10	Fernie	3500	4/1	17	4.3	8.4	8.4	15
14A9	Griffin Creek Divide	5100	3/15	46	11.8	-	-	-
14A3	Hell Roaring Divide	5770	3/21	88	33.2	32.5	31.2	15
13B13A	Holbrook	4530	4/3	15	6.6	11.8	10.4	7
14A6	Kishenehn	3886	3/28	25	6.9	8.9	10.8	15
14A5	Logan Creek	4300	3/24	24	5.7	11.1	9.8	15
13A5M	Marias Pass	5250	4/2	37	12.5	21.1	20.3	15
13A16	Mineral Creek	4500	4/2	53	20.2	23.3	-	-
Can 10A	New Fernie	4100	4/1	36	9.4	15.2	16.6	7
13B7	North Fork Jocko	6330	3/31	101	40.8	62.4	44.4	15
13A13	Quintonkon	3800	3/30	35	12.0	20.2	14.9	7
13B2	Spotted Bear Mountain	7000	3/29	34	12.0	21.1	16.0	10
13A10	Strawberry Lake	6500	3/31	112	48.6	56.7	44.0	10
13B1	Trinkus Lake	6500	3/31	108	40.1	69.4	42.4	10
13A12M	Trout Lake	3600	3/28	35	14.3	17.8	17.8	10
14B1	TV Mountain	6800	4/3	44	12.3	22.0	-	-
13B11	Twin Creeks	3580	3/28	26	9.5	15.6	10.6	7
13B5	Upper Holland Lake	7000	3/31	84	27.6	48.9	37.6	9
14A7	Weasel Divide	5450	3/23	87	31.5	33.9	33.4	15

E Estimated water content.

E Estimated water content.

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

WATER SUPPLY OUTLOOK

LOWER CLARK FORK RIVER BASIN MONTANA

AS OF :

APRIL 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for 1960 on the Clark Fork River is only FAIR. Streamflow forecasts for the April-September period range from 78 to 68 percent average. A comparison with last year's flow indicates that the 1960 flow will be 32 to 40 percent less than last year.

Snow Surveys made on or about April first indicate a very low streamflow this season; however, the above normal precipitation this past fall, together with a high base flow during the winter, has raised streamflow percent average above the percent average indicated by the snow-pack.

Detail forecast volumes and comparisons with the 1943-57 average are shown on Page 3 opposite the map of the Lower Clark Fork Watershed III.

Soil moisture beneath the snow-pack is above average.

Reservoir storage in Flathead Lake and Hungry Horse Reservoir is above the April first average.

Report Prepared by _____

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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



WATER SUPPLY FORECASTS

AS OF APRIL 1, 1960 - WATERSHED III

(1000 Acre Feet)

FORECAST POINT		FORECAST	FORECAST	%	MEASURED +	
NO.	NAME	PERIOD	THIS YEAR	NORMAL	LAST YEAR	NORMAL
3400	BLACKFOOT RIVER Bonner (near)	Apr-Sept Apr-July Apr-June	745 665 541	74 73 70	1338 1214 1050	999 903 775
3404	CLARK FORK RIVER Milltown (above) (14)	Apr-Sept Apr-July Apr-June	533 452 388	65 63 64	696 610 516	815 716 609
3405	Missoula (above)	Apr-Sept Apr-July Apr-June	1278 1117 928	70 69 67	2034 1824 1566	1814 1620 1384
3530	Missoula (below)	Apr-Sept Apr-July Apr-June	2300 2045 1693	68 67 65	3709 3331 2885	3361 3059 2608
3545	St. Regis (at)	Apr-Sept Apr-July Apr-June	3061 2728 2254	67 66 63	5135 4634 4023	4549 4140 3551
3890	Plains (near) (18)	Apr-Sept Apr-July Apr-June	9478 8718 7280	77 77 76	15427 13965 11859	12330 11308 9617
3910	Thompson Falls (at)(18)	Apr-Sept Apr-July Apr-June	10112 9300 7780	78 78 77	16323 14806 12472	13017 11944 10156
3920	Whitehorse Rapids (at)(19)	Apr-Sept Apr-July Apr-June	10676 9816 8193	77 77 76	11454# 10579# 9712#	13932 12763 10816
(14) Difference in observed flow, Clark Fork above Missoula & Blackfoot at Bonner. (18) Observed flow plus change in storage in Flathead Lake & Hungry Horse Res. (19) Observed flow plus change in storage in Hungry Horse Reservoir, Flathead Lake and Noxon Reservoir. (#) 1958 data; 1959 data not available. (+) Provisional data furnished by U. S. Geological Survey.						

RESERVOIR STORAGE DATA

AS OF MARCH 31, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
3913	Noxon	200.1	179.0	0	-

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

SNOW SURVEY DATA

AS OF

APRIL 1, 1960

WATERSHED III

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
15B11	Baree Creek	5500	4/1	106	36.7	57.2	-	-
15B1	Baree Mountain	6000	4/1	104	36.0	54.3	46.4	15
13B10	Coyote Hill	4200	3/31	27	8.4	12.4	11.2	11
15C2	Fish Lake Airstrip	5000	4/3	89	33.8	41.7	41.5	5
15B10	Freezeout Summit	6800	4/4	69	25.8	37.0	36.8	15
15C1	Hoodoo Creek	6200	4/4	97	37.4	56.1	53.2	15
14C5	Lolo Pass	5230	3/24	67	24.8	32.0	36.7	14
15B2	Lookout	5250	3/30	86	28.5	39.8	38.7	15
13C8	Lubrecht Forest #6	4040	4/1	0	0	2.2	3.7	7
13B7	North Fork Jocko	6330	3/31	101	40.8	62.4	44.4	15
14C6	Powell R. S.	4230	3/24	35	12.0	11.4	-	-
14C4	Savage Pass	6600	3/25	60	21.2	29.4	30.3	14
14B1	TV Mountain	6800	4/3	44	12.3	22.0	-	-

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

WATER SUPPLY OUTLOOK

UPPER CLARK FORK RIVER BASIN

MONTANA

AS OF :

APRIL 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The 1960 Water Supply Outlook for the Upper Clark Fork River is only FAIR. Snow Surveys made on or about April first at 15 courses in higher elevations of this basin indicate that this year's snow-pack is 37 percent less than last year's snow-pack, and 66 percent of the 1943-57 average.

Streamflow forecast figures are shown in detail on page 3 of this report, opposite the map, for Flint Creek at Maxville, Middle Fork Rock Creek, Boulder River at Maxville, and the Clark Fork above Milltown. Note that the percent average flow is exceedingly low on all streams. Boulder Creek is forecast at 85 percent average and is probably the best local outlook.

Fall precipitation was above average; base flow in all streams during the fall and winter months was high. This combination should produce a higher streamflow than is indicated by the snow-pack.

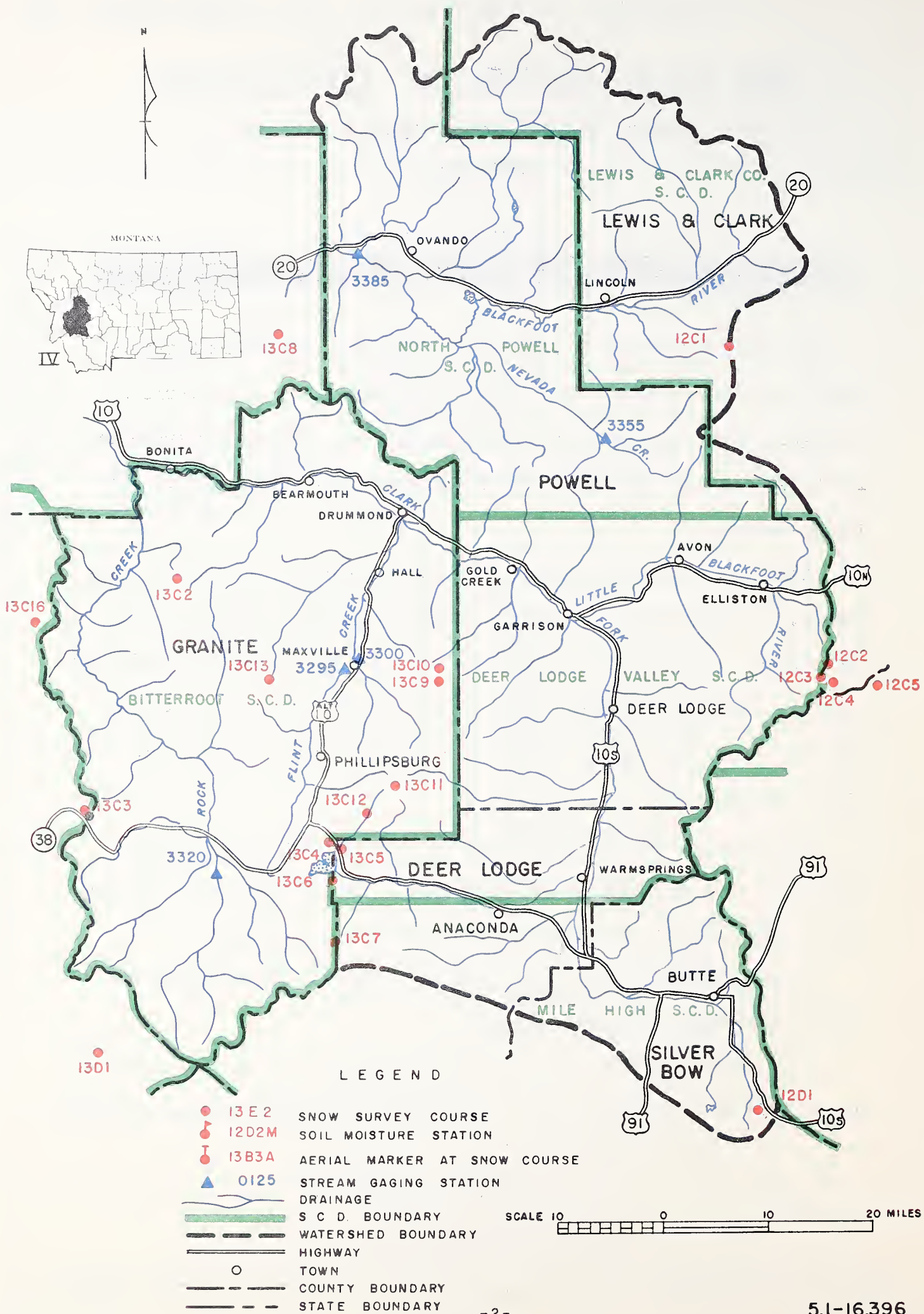
Ungaged streams, Race Track Creek and Dempsey Creek, should flow about 37 percent less than last year.

Judging from weather conditions this spring, it is anticipated that runoff will be early this year. A cold May could reverse this prediction.

Report Prepared by

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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



WATER SUPPLY FORECASTS

AS OF APRIL 1, 1960 - WATERSHED IV

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	%	MEASURED ⁺	
NO.	NAME				LAST YEAR	NORMAL
3295	FLINT CREEK Maxville (at)	Apr-Sept Apr-July Apr-June	29.8 22.1 16.8	64 63 60	51.5# 37.8# 27.3#	46.4 35.4 28.0
3300	BOULDER CREEK Maxville (at)	Apr-Sept Apr-July Apr-June	24.2 21.9 18.2	86 85 85	26.8# 24.6# 20.9#	28.2 25.8 21.4
3320	MIDDLE FORK ROCK CREEK Philipsburg (near)	Apr-Sept Apr-July Apr-June	62.4 58.3 46.2	78 80 78	72.1# 65.0# 55.5#	80.2 72.1 59.4
3404	CLARK FORK RIVER Milltown (above) (14)	Apr-Sept Apr-July Apr-June	533 452 388	65 63 64	696 610 516	815 716 609
(14) Difference in observed flow, Clark Fork above Missoula and Blackfoot at Bonner. (+) Provisional data furnished by U. S. Geological Survey. (#) 1958 data; 1959 data not available.						

RESERVOIR STORAGE DATA

AS OF MARCH 31, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
3250 3365	Georgetown Lake Nevada Creek	31.0 12.6	28.8 -	23.2 3.2	21.6 8.1

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

SNOW SURVEY DATA

AS OF APRIL 1, 1960

WATERSHED IV

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
13C16	Ambrose	6475	3/28	29	8.9	-	-	-
13C13	Black Pine	7100	3/23	35	10.2	14.9	-	-
12C5	Chessman Reservoir	6200	3/31	6	1.6	6.0	5.1	15
13C9	El Dorado Mine	7800	3/25	56	18.6	23.3	22.6	6
13C11	Fred Burr Pass	8000	3/22	58	20.4	29.9	-	-
13C10	Gold Creek Lake	7200	3/25	38	11.2	17.8	17.7	5
13C4	Intergaard	6450	4/1	0	0	8.4	8.1	12
13C8	Lubrecht Forest #6	4040	4/1	0	0	2.2	3.7	7
12D1	Pipestone Pass	7200	3/31	19	5.6	6.2	6.0	15
13C12	Red Lion	7000	3/22	40	12.1	18.2	-	-
13C3	Skalkaho Summit	7259	3/23	55	18.0	28.4	28.2	15
13C2	Slide Rock Mountain	7100	3/24	38	11.8	15.7	15.9	15
13C5	Southern Cross	6500	4/1	11	3.0	6.8	6.1	12
12C1	Stemple Pass	6900	4/1	29	8.2	15.1	11.0	15
13C7	Storm Lake	7780	3/22	38	11.3	15.6	15.6	15
13C6	Stuart Mill	6500	4/1	16	4.1	7.7	7.1	12
12C2	Ten Mile, Lower	6250	4/3	13	4.1	7.9	7.2	14
12C3	Ten Mile, Middle	6800	4/2	29	9.1	11.8	11.3	15
12C4	Ten Mile, Upper	8000	4/2	37	12.0	16.1	14.4	15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

WATER SUPPLY OUTLOOK

BITTERROOT RIVER BASIN

MONTANA

AS OF :

APRIL 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The 1960 Water Supply Outlook for the Bitterroot Valley is only FAIR. Snow Survey measurements made on or about April first indicate this year's snow-pack is 28 percent less than last year and only 66 percent of the 1943-57 average.

The Bitterroot River at Darby is forecast to flow 412,000 acre feet of water during the April-September period, or 70 percent average. Fall precipitation was above average; base flow in the streams during the fall and winter months was high. This combination should produce a higher streamflow than is indicated by the snow-pack.

Soil moisture is extremely high this spring.

Blodgett Creek is forecast to produce the best water supply in the Valley. Burnt Fork Creek is forecast to flow between 60 and 50 percent average.

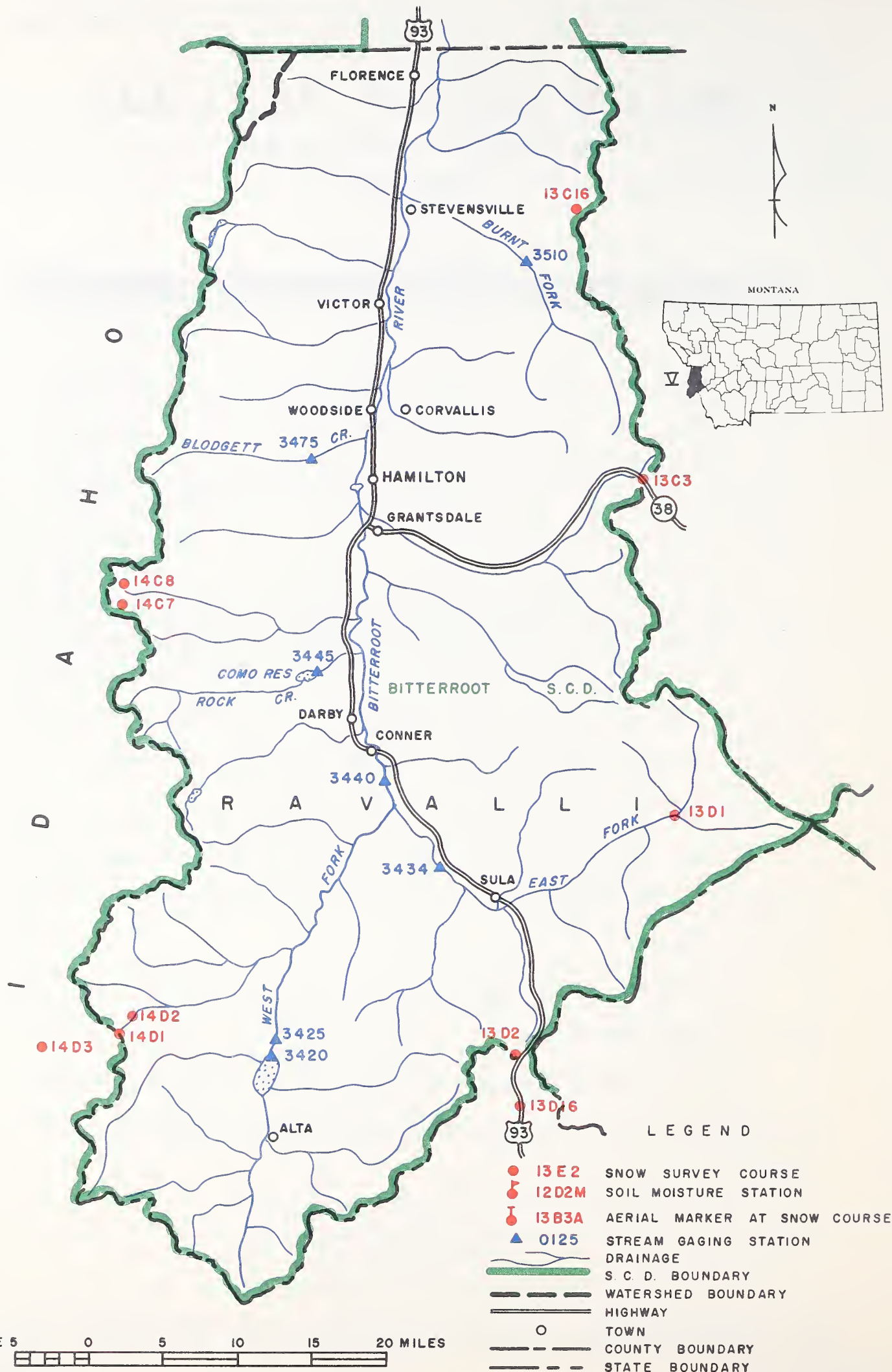
Forecast figures for the Bitterroot Valley streams are shown on Page 3 of this report.

Reservoir storage data for Como Lake and West Fork Bitterroot Reservoir for comparison with other years are not available at this time.

Report Prepared by

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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



WATER SUPPLY FORECASTS

AS OF APRIL 1, 1960 - WATERSHED V

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	%	MEASURED +	
NO.	NAME				LAST YEAR	NORMAL
3425	WEST FORK BITTERROOT RIVER Conner (near) (15)	Apr-Sept Apr-July Apr-June	96.8 86.7 73.7	55 53 50	193 181 166	176 164 147
3440	BITTERROOT RIVER Darby (near)	Apr-Sept Apr-July Apr-June	412 374 301	70 68 63	593 545 480	587 547 477
3475	BLODGETT CREEK Corvallis (near)	Apr-Sept Apr-July Apr-June	43.1 38.8 32.3	92 87 85	46.5 43.6 37.1	46.7 44.4 37.9
3510	BURNT FORK CREEK Stevensville (near)	Apr-Sept Apr-July Apr-June	18.9 15.7 11.3	60 56 50	25.5 22.2 18.8	31.2 28.0 23.1
(15) Observed flow plus change in storage in West Fork Bitterroot River Reservoir. (+) Provisional data furnished by U. S. Geological Survey.						

RESERVOIR STORAGE DATA

AS OF

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

SNOW SURVEY DATA

AS OF APRIL 1, 1960

WATERSHED V

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
13C16	Ambrose	6475	3/28	29	8.9	-	-	-
13D1	East Fork R. S.	5400	3/31	16	4.4	7.5	7.1	15
13D2	Gibbons Pass	7100	3/31	52	16.6	23.5	25.7	15
14D3	Kit Carson	4700	3/30	22	6.9	9.2	9.0	15
14C5	Lolo Pass	5230	3/24	67	24.8	32.0	36.7	14
14C7	Lost Horse	5940	3/29	68	24.4	-	-	-
13D16	Moose Creek	6200	3/25	39	12.7	14.5	18.3	15
14D2	Nez Perce Camp	5580	3/30	36	11.2	14.1	15.5	15
14D1	Nez Perce Pass	6575	3/30	40	11.1	17.4	19.7	15
14C6	Powell R. S.	4230	3/24	35	12.0	11.4	-	-
14C4	Savage Pass	6600	3/25	60	21.2	29.4	30.3	14
13C3	Skalkaho Summit	7259	3/23	55	18.0	28.4	28.2	15
14C8	Twin Lakes	6510	3/29	87	32.8	-	-	-

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

WATER SUPPLY OUTLOOK

MARIAS, TETON, & SUN RIVER BASINS

MONTANA

AS OF:

APRIL 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The 1960 Water Supply Outlook for the Marias, Teton and Sun River basins is FAIR to POOR.

Snow Surveys made at eleven (11) snow courses in the headwaters of these river basins on or about April first indicate that this year's snow-pack is 53 percent of last year's and only 50 percent of the 1943-57 average. Warm weather during the last two weeks of March removed most of the low elevation snow.

Fall precipitation was above normal and soil beneath the snow-pack and the soil in the valleys is well saturated. This should produce more than usual runoff. Base flow has been exceptionally high all winter.

Streamflow forecasts, comparisons with last year and averages are shown in detail on Page 3 of this report.

Reservoir storage is GOOD for the first of April.

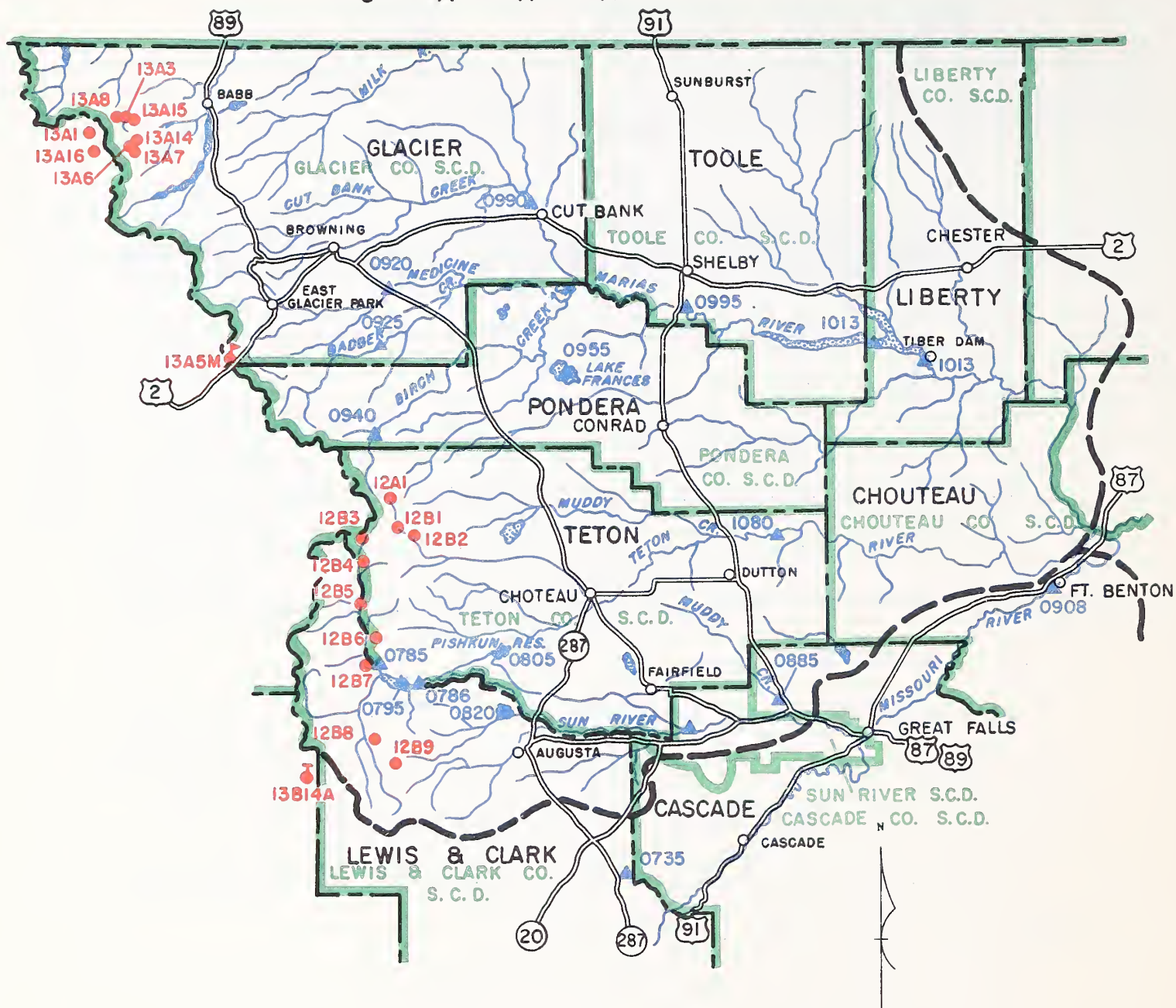
The Sun River above Gibson Reservoir is forecast to flow 448,000 acre feet from April through September, or only 59 percent of last year and 78 percent of the 1943-57 average flow.

The Marias River is forecast to flow 475,000 acre feet of water during the April-September period, or 72 percent average.

Report Prepared by

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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



LEGEND

- 13 E 2 SNOW SURVEY COURSE
- 1202M SOIL MOISTURE STATION
- 13B3A AERIAL MARKER AT SNOW COURSE
- ▲ 0125 STREAM GAGING STATION
- DRAINAGE
- S C D. BOUNDARY
- WATERSHED BOUNDARY
- HIGHWAY
- TOWN
- COUNTY BOUNDARY
- STATE BOUNDARY

VI

MONTANA



SCALE 10 0 10 20 30 40 MILES

WATER SUPPLY FORECASTS

AS OF APRIL 1, 1960 - WATERSHED VI

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	%	MEASURED [†]	
NO.	NAME				LAST YEAR	NORMAL
0995	MARIAS RIVER Shelby (near)	Apr-Sept Apr-July	475 444	72 74	464# 424#	659 605
0785	N.FORK OF N.FORK SUN Augusta (near)	Apr-Sept Apr-July	195 182	82 82	293 271	239 222
0786	SUN RIVER Gibson Dam (at)	Apr-Sept Apr-July	448 410	78 78	749 689	574 526
(#) 1958 data; 1959 data not available. (+) Provisional data furnished by U. S. Geological Survey.						

RESERVOIR STORAGE DATA

AS OF MARCH 31, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
1013	Tiber	1316.0	666.3	696.5	-
0955	Lake Francis	112.0	-	96.6	96.0
0805	Pishkun	32.0	21.6	19.4	18.6
0795	Gibson	105.0	79.5	61.9	66.4
0820	Willow Creek	32.3	18.5	28.7	20.2
0940	Swift	30.0	-	30.1	24.7

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

SNOW SURVEY DATA

AS OF APRIL 1, 1960

WATERSHED VI

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
12B8	Benchmark	5500	3/29	9	3.7	8.8	11.2	9
12B6	Cabin Creek	5400	4/3	7	3.4	10.1	7.5	9
12B9	Five Bull	5600	3/29	6	2.0	8.5	8.4	9
12A1	Freight Creek	6000	3/28	28	8.8	20.4	18.6	10
12B5	Gates Park	5300	4/3	17	6.3	13.9	11.7	9
12B7	Goat Mountain	7000	3/31	26	6.0	15.4	12.4	15
13A5M	Marias Pass	5250	4/2	37	12.5	21.1	20.3	15
12B2	Waldron Creek	5600	3/28	0	0	7.7	8.4	10
12B1	West Fork	6000	3/28	21	8.6	16.8	19.4	10
12B4	Wrong Creek	5700	4/3	26	10.3	19.7	16.8	9
12B3	Wrong Ridge	6800	4/3	46	17.3	26.1	24.2	9

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

WATER SUPPLY OUTLOOK

MISSOURI RIVER (MAIN STEM) BASIN

MONTANA

AS OF :

APRIL 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The 1960 Water Supply Outlook for the Missouri Main Stem from Toston to Fort Peck is forecast at 80 percent of the 1943-57 average flow. This forecast is only 5 to 10 percent less than last year's flow.

Detail forecast data is listed on Page 3 of this report for the major stream gaging stations along the river.

Small unmeasured streams may not reflect this high percentage of flow, due to the warm weather that melted much of the low elevation snow. These small streams should flow about 35 percent less water than last season.

Generally, reservoir storage is GOOD.

Soil moisture is high for the first of April.

Report Prepared by _____

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BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

LEGEND

- | | | |
|---|----------|------------------------------|
| ● | 13 E 2 | SNOW SURVEY COURSE |
| ♪ | 12 D 2 M | SOIL MOISTURE STATION |
| ● | 13 B 3 A | AERIAL MARKER AT SNOW COURSE |
| ▲ | 0125 | STREAM GAGING STATION |
|  | | DRAINAGE |
|  | | S. C. D. BOUNDARY |
|  | | WATERSHED BOUNDARY |
|  | | HIGHWAY |
|  | | TOWN |
|  | | COUNTY BOUNDARY |
|  | | STATE BOUNDARY |



SCALE 10 0 10 20 30 40 MILES

WATER SUPPLY FORECASTS

AS OF APRIL 1, 1960 - WATERSHED VII

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	s NORMAL	MEASURED ⁺	
NO.	NAME				LAST YEAR	NORMAL
0545	MISSOURI RIVER Toston (at) (3)	Apr-Sept Apr-July	1896 1649	81 81	1991 1726	2342 2030
0908	Fort Benton (at) (5)	Apr-Sept Apr-July	2955 2526	82 82	3138 2654	3599 3076
1095	Virgelle (at) (6)	Apr-Sept Apr-July	3542 3071	81 81	4001 3431	4393 3803
1150	Zortman (near) (6)	Apr-Sept Apr-July	3895 3359	81 81	4574 3919	4806 4143
1320	Ft. Peck Dam (below)(7)	Apr-Sept Apr-July	3807 3352	80 80	4085 3588	4761 4181
1770	Wolf Point (near) (7)	Apr-Sept Apr-July	4169 3696	79 79	4264 3741	5261 4652
3300	Williston, N. D. (8)	Apr-Sept Apr-July	8973 7878	71 71	10729 10136	12562 11101
0615	PRICKLY PEAR CREEK Clancy (near)	Apr-Sept Apr-July	24.7 21.2	103 101	18.1 15.9	23.9 20.8
(3) Observed flow plus change in storage in Hebgen and Ennis Lakes. (5) Observed flow plus change in storage in Canyon Ferry. (6) Observed flow plus change in storage in Canyon Ferry and Tiber Reservoirs. (7) Observed flow plus change in storage in Canyon Ferry, Tiber and Fort Peck Reservoirs. (8) Observed flow plus change in storage in Fort Peck, Canyon Ferry, Tiber, Buffalo Bill and Boysen Reservoirs. (+) Provisional data furnished by U. S. Geological Survey.						

RESERVOIR STORAGE DATA

AS OF MARCH 31, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
0585	Canyon Ferry	2043.0	1774.0	1774.0	1328.0
0645	Lake Helena	10.4	7.6	7.6	5.3
0660	Holter Lake	81.9	51.8	51.8	54.3
0650	Hauser Lk. & Lk.Helena	61.9	53.6	53.6	43.8
1315	Fort Peck	19410.0	11360.0	9637.0	11606.0

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

WATERSHED VII

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

WATER SUPPLY OUTLOOK

BEAVERHEAD, & JEFFERSON RIVER BASINS

MONTANA

AS OF :

APRIL 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

Snow Survey measurements made in the Beaverhead and Jefferson River basin on or about April first indicate the water stored in the snow-pack is 72 percent of last year and 63 percent of the 1943-57 average. A decrease in water content from March first was noted at about one-third of the snow courses in the drainage.

Streamflow is forecast to be about 30 percent below average in the upper reaches of the Beaverhead drainage and 10 percent below average for the Big Hole and Jefferson Rivers. Fall precipitation was above average; base flow in the streams during the fall and winter months was high. This combination should produce a higher streamflow than is indicated by the snow-pack. Streamflow is expected to be slightly higher than last year; however, if the current trend of above normal temperatures continues, the majority of the runoff will occur much earlier than last year. Below normal precipitation in the summer months could result in a short water supply during the heavy irrigation period.

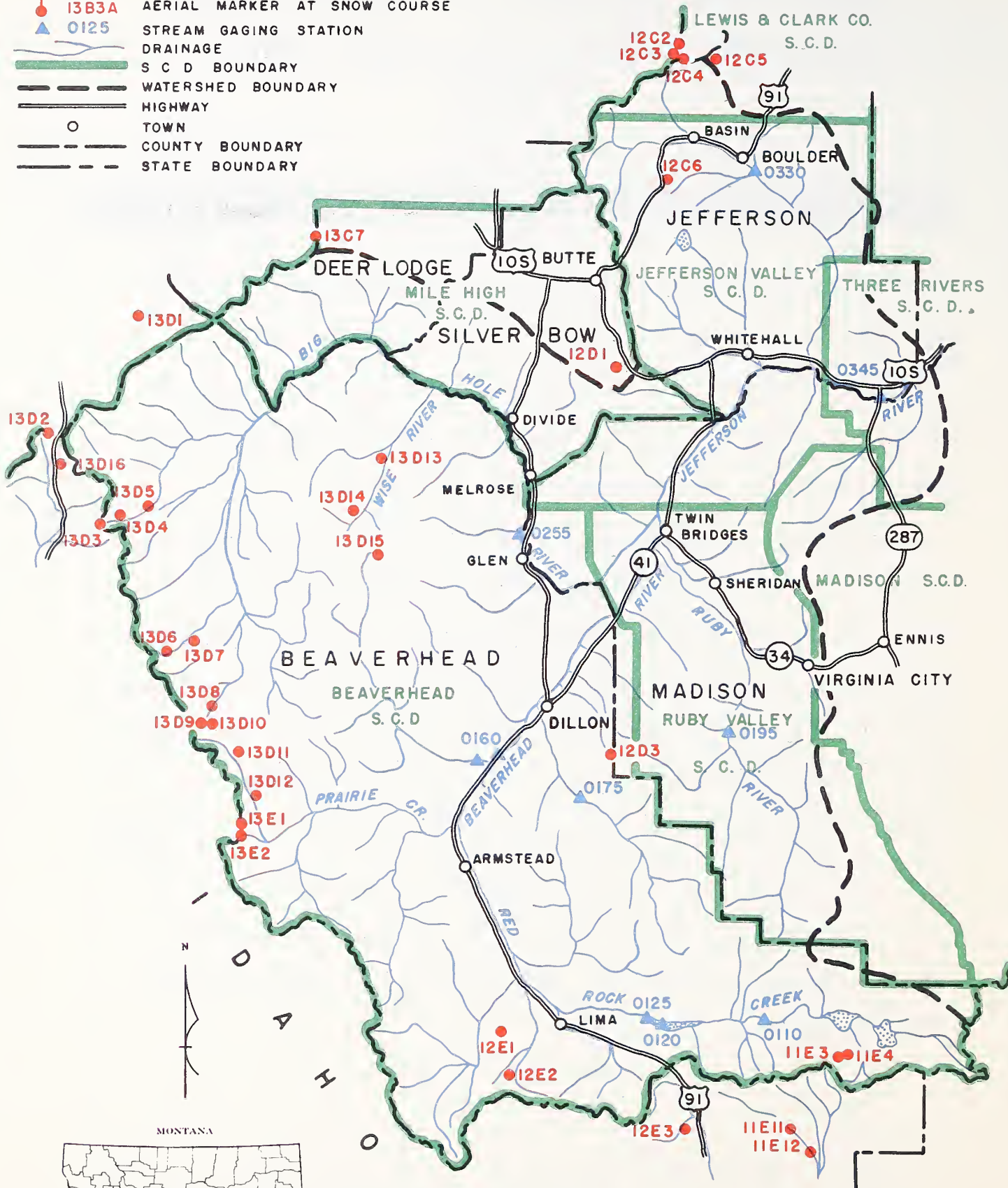
Report Prepared by

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SOIL CONSERVATION SERVICE
BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

L E G - E N D

- | | | |
|---|----------|------------------------------|
| ● | 13 E 2 | SNOW SURVEY COURSE |
| ● | 12 D 2 M | SOIL MOISTURE STATION |
| ● | 13 B 3 A | AERIAL MARKER AT SNOW COURSE |
| ▲ | 0125 | STREAM GAGING STATION |
|  | | DRAINAGE |
|  | | S C D BOUNDARY |
|  | | WATERSHED BOUNDARY |
|  | | HIGHWAY |
|  | | TOWN |
|  | | COUNTY BOUNDARY |
|  | | STATE BOUNDARY |



MONTANA



VIII

SCALE 10 0 10 20 30 40 MILES



WATER SUPPLY FORECASTS

AS OF APRIL 1, 1960 - WATERSHED VIII

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	%	MEASURED +	
NO.	NAME				LAST YEAR	NORMAL
0110	RED ROCK RIVER Kennedy Ranch (at)	May-Sept May-July	32.9 29.5	60 60	34.1 28.8	54.9 49.1
0125	Monida (near) (1)	Apr-Sept Apr-July	59.6 55.8	69 68	53.6 49.1	86.4 82.2
0160	BEAVERHEAD RIVER Barratts (at) (1)	Apr-Sept Apr-July	121 107	70 69	90 68	173 155
0255	BIG HOLE RIVER Melrose (near)	Apr-Sept Apr-July	701 657	91 92	644 592	770 714
0330	BOULDER RIVER Boulder (near)	Apr-Sept Apr-July	72.7 69.7	91 92	67.5 64.8	79.9 76.5
0345	JEFFERSON RIVER Sappington (at)	Apr-Sept Apr-July	977 880	91 92	835 750	1074 958
(1) Observed flow plus change in storage in Lima Reservoir. (+) Provisional data furnished by U. S. Geological Survey.						

RESERVOIR STORAGE DATA

AS OF MARCH 31, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
0120	Lima Ruby	84.0 38.8	28.9 32.4	30.4 -	33.9 25.9

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

SNOW SURVEY DATA

AS OF

APRIL 1, 1960

WATERSHED VIII

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
13D14	Anderson Meadow	7000	3/22	19	5.1	6.6	9.2	10
13D4	Below Big Hole Pass	6900	3/23	37	9.9	14.2	15.9	10
13D3	Big Hole Pass	7240	3/23	40	10.7	15.8	19.0	10
13D10	Bloody Dick	7600	3/24	30	8.3	10.8	12.7	10
11E11	Blue Ledge Mine	6700	3/29	31	8.4	12.2	17.2	15
12E3	Camp Creek	6800	3/30	21	5.8	8.5	10.4	15
12C5	Chessman Reservoir	6200	3/31	6	1.6	6.0	5.1	15
13D5	East Boundary	6700	3/23	16	4.2	8.1	9.5	10
13D15	Elk Horn	8450	3/30	26	6.6	10.3	10.7	15
13D2	Gibbons Pass	7100	3/31	52	16.6	23.5	25.7	15
13D9	Gold Stone	8100	3/24	38	11.3	14.0	16.7	10
13D8	Jahnke Creek	7340	3/24	29	8.1	10.0	12.5	10
11E12	Kilgore	6200	3/29	20	6.4	8.8	10.3	15
11E4	Lakeview Canyon	6930	3/31	26	7.3	8.3	10.9	10
11E3	Lakeview Ridge	7400	3/31	22	5.4	6.6	10.0	10
13E1	Lemhi Pass	7480	3/27	23	6.8	8.7	10.0	10
12E2	Limekiln	6950	3/28	0	0	0	1.7	10
13D6	Miner Forks	7300	3/25	35	9.2	13.2	13.8	10
13D7	Miner Lake	6720	3/25	26	6.5	10.8	9.1	13
13D16	Moose Creek	6200	3/25	39	12.7	14.5	18.3	15
12C6	Picnic Grounds	6500	4/1	10	2.6	4.5	4.5	12
12D1	Pipestone Pass	7200	3/31	19	5.6	6.2	6.0	15
13D11	Selway Junction	6800	3/29	19	5.6	7.0	9.7	10
13C7	Storm Lake	7780	3/22	38	11.3	15.6	15.6	15
12C2	Ten Mile, Lower	6250	4/3	13	4.1	7.9	7.2	14
12C3	Ten Mile, Middle	6800	4/2	29	9.1	11.8	11.3	15
12C4	Ten Mile, Upper	8000	4/2	37	12.0	16.1	14.4	15
13D12	Terrell Creek	6650	3/29	2	0.9	5.1	5.1	10
13E2	Trail Creek	7090	3/27	26	7.8	7.8	9.4	10
11E1	White Pine Ridge	8850	3/28	12	3.0	3.6	6.4	10
13D13	Wise River	6300	3/22	15	3.8	4.4	5.9	10

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

WATER SUPPLY OUTLOOK

MADISON, & GALLATIN RIVER BASINS

MONTANA

AS OF :

APRIL 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the Madison and Gallatin drainages is only FAIR. Snow Surveys made near the first of April indicate that water stored in the snow is about 30 percent less than last year and 62 percent of the 1943-57 average.

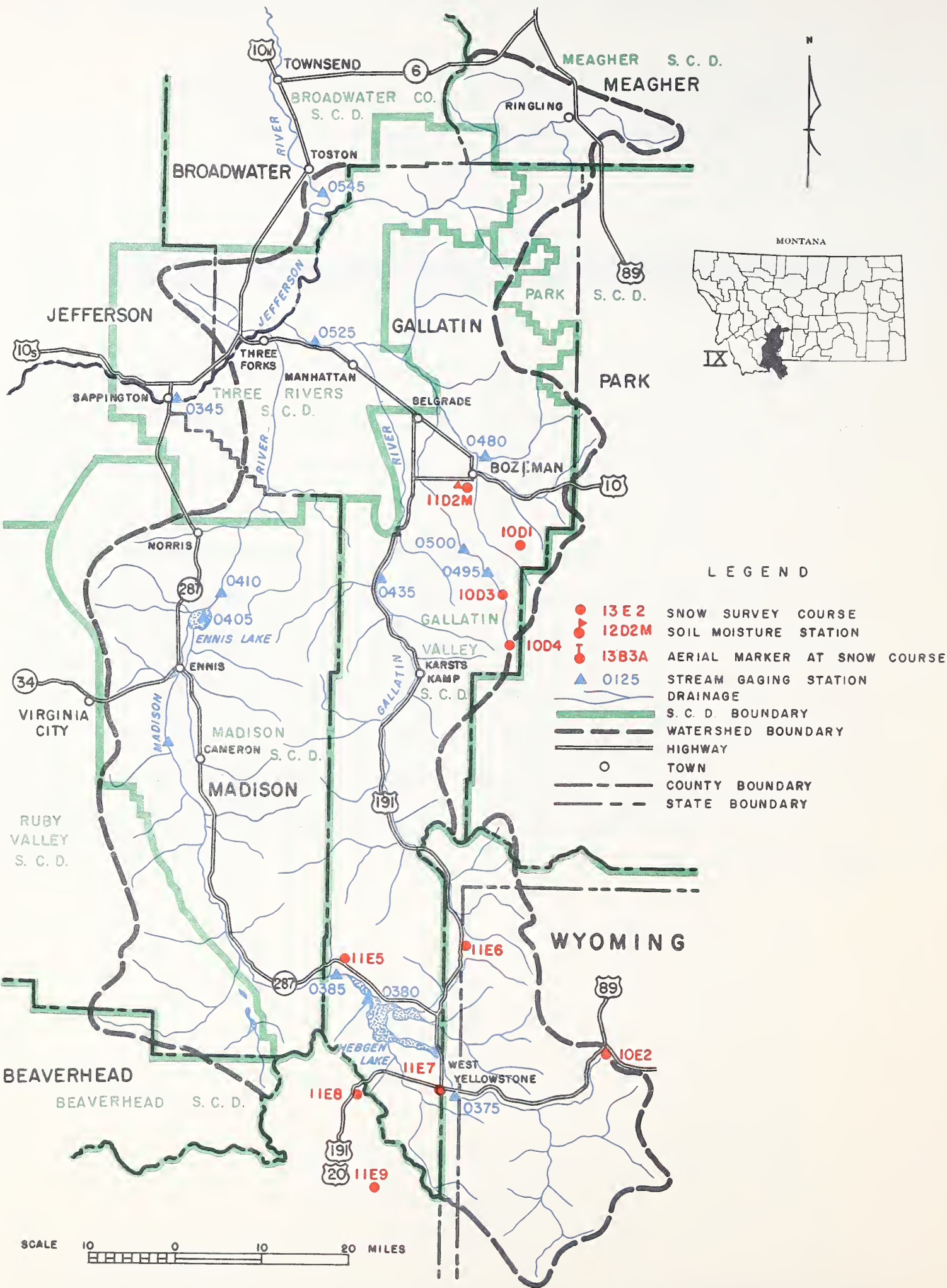
The Madison River near West Yellowstone is forecast to flow 153,000 acre feet during the April through September period, or 20 percent less than last year. The West Gallatin River near Gateway is expected to produce only 75 percent of last year during the April through September period. Hyalite Creek has the best outlook for near normal runoff with 34,700 acre feet forecast for the April through September period.

Soil moisture is much above normal with most soil in the area being almost saturated.

Report Prepared by

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SOIL CONSERVATION SERVICE
BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



WATER SUPPLY FORECASTS

AS OF APRIL 1, 1960 - WATERSHED IX

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	%	MEASURED +	
NO.	NAME				LAST YEAR	NORMAL
0375	MADISON RIVER West Yellowstone (nr)	Apr-Sept Apr-July	153 112	71 68	192 137	216 165
0385	Grayling (near) (2)	Apr-Sept Apr-July	318 242	71 68	366 271	448 357
0410	McAllister (near) (3)	Apr-Sept Apr-July	567 444	75 72	679 526	756 613
0435	WEST GALLATIN RIVER Gateway (near)	Apr-Sept Apr-July	377 320	82 81	506 418	459 395
0500	Hyalite Cr. R.S.(at)(4)	Apr-Sept Apr-July	34.7 29.2	96 94	44.6 39.1	36.1 31.0
0480	EAST GALLATIN RIVER Bozeman (at)	Apr-Sept Apr-July	34.7 30.8	75 75	50.6 44.3	46.4 40.7
0525	GALLATIN RIVER Logan (at)	Apr-Sept Apr-July	366 304	74 72	514 441	492 422
(2) Observed flow plus change in storage in Hebgen Lake. (3) Observed flow plus change in storage in Hebgen and Ennis Lakes. (4) Observed flow plus change in storage in Hyalite Reservoir. (+) Provisional data furnished by U. S. Geological Survey.						

RESERVOIR STORAGE DATA

AS OF MARCH 31, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
0380	Hebgen Lake	345.0	8.9	167.6	208.3
0405	Ennis Lake	41.0	38.2	38.4	35.3
0500	Middle Creek	8.0	4.4	4.3	4.0

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

SNOW SURVEY DATA

AS OF APRIL 1, 1960

WATERSHED IX

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
11E9	Big Springs	6500	3/31	34	11.0	16.9	23.5	15
10D4	Devil's Slide	8100	4/2	77	23.0	28.0	21.2	15
11E5	Hebgen	6550	3/23	27	7.6	11.3	12.6	15
10D3	Hood Meadow	6600	4/1	28	7.9	11.4	9.8	15
11E10	Island Park	6315	3/31	30	8.9	13.7	17.8	15
10D1	New World	6700	3/30	30	9.2	13.4	10.6	15
10E2	Norris Basin	7500	3/31	25	6.6	8.5	10.3	12
10D10	Sacajawea	6550	3/24	39	12.5	-	-	-
11E6	Twenty-One Mile	7150	3/25	30	8.8	15.8	19.2	15
11E8	Valley View	6500	3/31	32	8.0	13.8	16.4	15
11E7	West Yellowstone	6700	3/24	19	5.4	9.2	12.7	15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

WATER SUPPLY OUTLOOK

JUDITH, & MUSSELSHELL RIVER BASINS

MONTANA

AS OF :

APRIL 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

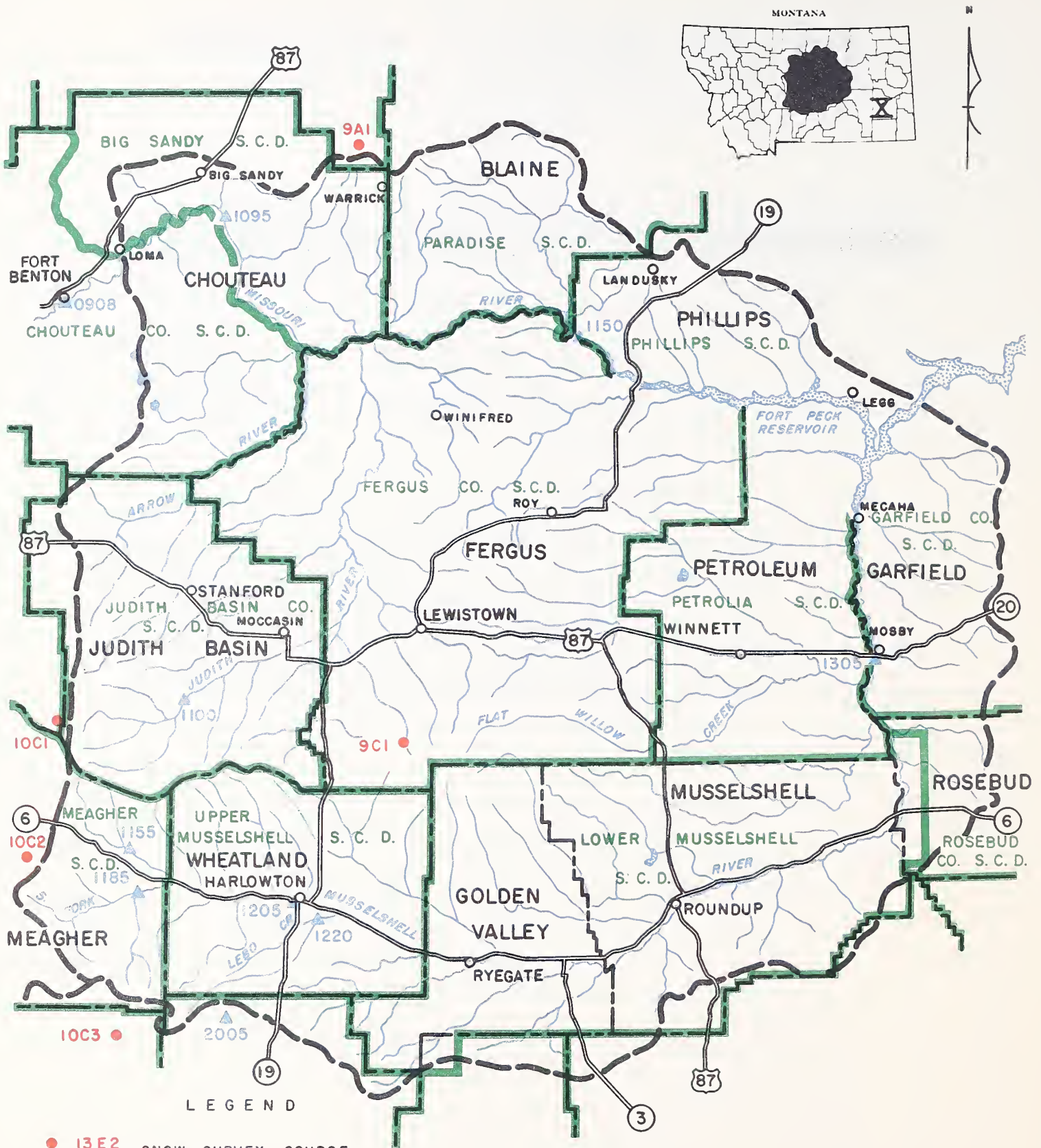
The Water Supply Outlook for the Judith and Musselshell River basins is GOOD. Snow Surveys made near the first of April indicate that water stored in the snow-pack is 74 percent of last year and is 86 percent of the 1943-57 average.

Streamflow in the Judith and Musselshell drainages is forecast to be near average during the April through September period. Above normal fall precipitation, high flows during the fall and winter months, and above normal soil moisture should produce more runoff than would normally be expected from the water presently stored in the snow-pack.

Report Prepared by

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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



- 13E2 SNOW SURVEY COURSE
 ● 12D2M SOIL MOISTURE STATION
 T 13B3A AERIAL MARKER AT SNOW COURSE
 ▲ 0125 STREAM GAGING STATION
 ——— DRAINAGE
 ——— S. C. D. BOUNDARY
 - - - WATERSHED BOUNDARY
 ——— HIGHWAY
 O TOWN
 ——— COUNTY BOUNDARY
 - - - STATE BOUNDARY

SCALE 10 0 10 20 30 40 MILES

WATER SUPPLY FORECASTS

AS OF APRIL 1, 1960 - WATERSHED X

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	%	MEASURED +	
NO.	NAME				LAST YEAR	NORMAL
1185	MUSSELSHELL RIVER South Fork Martinsdale (above)	Apr-Sept Apr-July	54.7 52.8	102 103	25.6# 24.2#	53.6 51.4
1205	Harlowton (at) (9)	Apr-Sept Apr-July	85 84	102 102	34.5# 33.9#	83.0 82.0
1095	MISSOURI RIVER Virgelle (at) (6)	Apr-Sept Apr-July	3542 3071	81 81	4001 3431	4393 3803
1150	Zortman (near) (6)	Apr-Sept Apr-July	3895 3359	81 81	4574 3919	4806 4143
(9) Observed flow plus change in storage in Durand Reservoir and Martinsdale Reservoirs. (6) Observed flow plus change in storage in Canyon Ferry and Tiber Reservoirs. (+) Provisional data furnished by U. S. Geological Survey. (#) 1958 data; 1959 data not available.						

RESERVOIR STORAGE DATA

AS OF MARCH 31, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
1165	Durand	7.0	-	5.6	5.3
1105	Ackley	5.8	4.1	-	4.3

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

AS OF APRIL 1, 1960

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
9C1	Crystal Lake	6100	3/15	50	14.4	16.8	11.8	15
10C2	Grasshopper	7000	3/31	16	3.6	6.4	5.6	15
10C1	Kings Hill	7950	4/1	42	11.9	16.6	13.8	15
10C3	Porcupine	6500	4/4	18	5.0	7.3	6.8	15
9A1	Rocky Boy	5200	3/31	5	2.1	3.2	5.2	15

USDA SCS-LINCOLN NEBR 1960

WATER SUPPLY OUTLOOK

UPPER YELLOWSTONE RIVER BASIN

MONTANA

AS OF :

APRIL 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the Upper Yellowstone River basin is only FAIR. Snow Survey measurements made near the first of April indicate the water stored in the snow-pack is 63 percent of last year and 65 percent of the 1943-57 average.

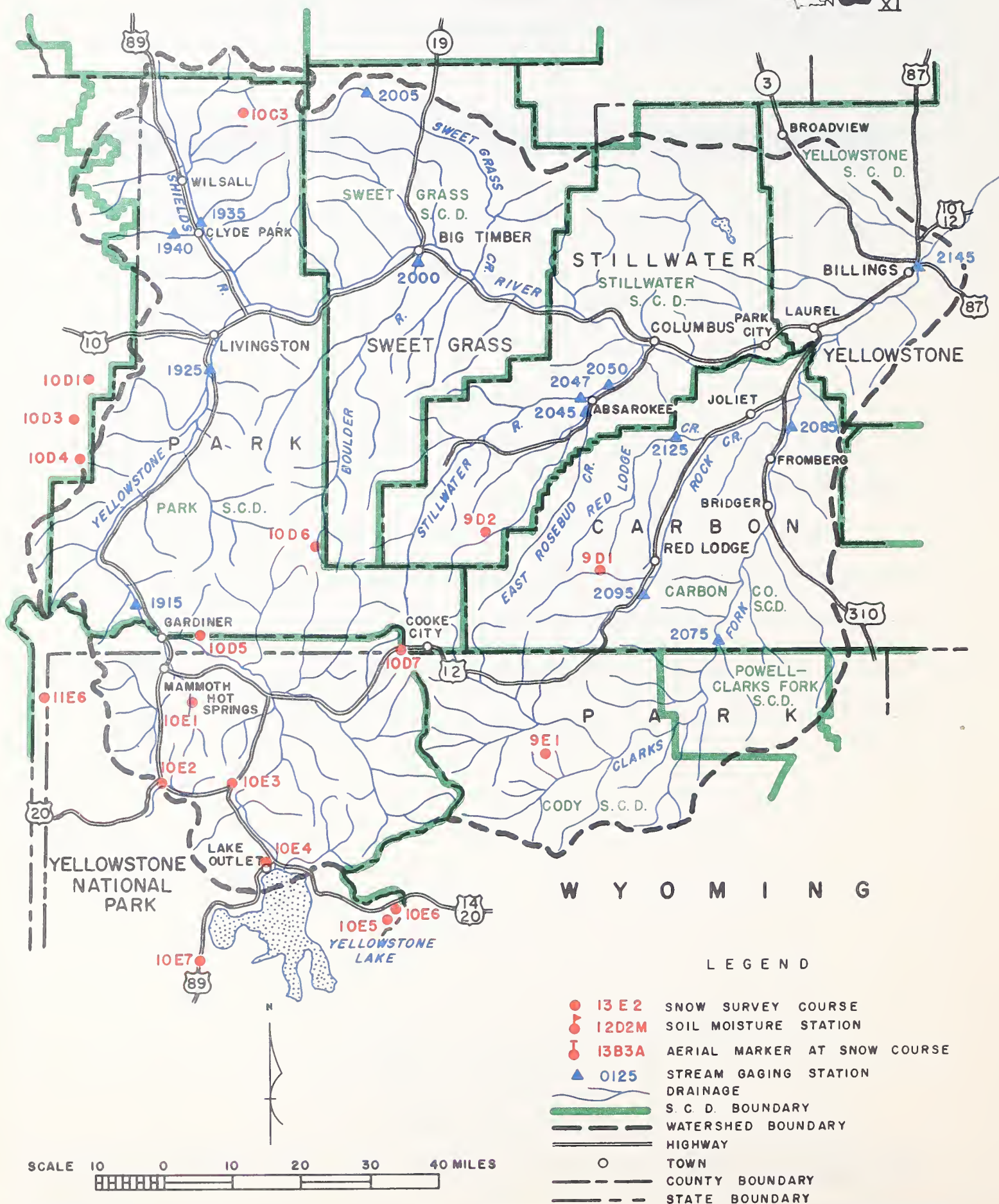
The Yellowstone River at Corwin Springs is forecast to flow 1,312,000 acre feet or about 25 percent less than last year during the April through September period.

The Clarks Fork River is expected to flow about 35 percent less than last year and the Stillwater River about 20 percent below average. The Shields River is forecast to flow about 40 percent above average. This forecast is based on the above normal fall precipitation, high stream flow during the fall and winter months, and above normal soil moisture.

Report Prepared by

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SOIL CONSERVATION SERVICE
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THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY



WATER SUPPLY FORECASTS

AS OF

APRIL 1, 1960 - WATERSHED XI

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	%	MEASURED +	
NO.	NAME				LAST YEAR	NORMAL
1915	YELLOWSTONE RIVER Corwin Springs (at)	Apr-Sept Apr-July	1312 1059	66 64	1785 1499	1980 1649
1925	Livingston (near)	Apr-Sept Apr-July	1448 1145	64 61	1630# 1368#	2252 1863
2145	Billings (at)	Apr-Sept Apr-July	2953 2494	69 68	4094 3608	4261 3657
3090	Miles City (at)(13)	Apr-Sept Apr-July	4491 3923	67 67	5238 4731	6707 5884
3295	Sidney (near) (13)	Apr-Sept Apr-July	4488 3948	65 64	4760 4393	6921 6137
1935	SHIELDS RIVER Clyde Park (at)	Apr-Sept Apr-July	158 143	142 139	50.0# 46.6#	111 103
2045	ROSEBUD CREEK Absarokee (near) (12)	Apr-Sept Apr-July	239 192	89 89	252# 202#	267 216
2050	STILLWATER RIVER Absarokee (near) (12)	Apr-Sept Apr-July	502 424	81 81	530# 445#	620 523
2075	CLARKS FORK RIVER Chance (at)	Apr-Sept Apr-July	430 393	70 71	648 601	617 552
2085	Edgar (at)	Apr-Sept Apr-July	464 419	71 73	652 589	652 575
2095	ROCK CREEK Red Lodge (near)	Apr-Sept Apr-July	103 79.4	92 92	97.5# 75.4#	112 86.3
(12)	Observed flow plus change in storage in Mystic Lake.					
(13)	Observed flow plus change in storage in Buffalo Bill and Boysen Reservoir.					
(+)	Provisional data furnished by U. S. Geological Survey.					
(#)	1958 data; 1959 data not available.					

RESERVOIR STORAGE DATA

AS OF

MARCH 31, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
2040	Mystic Lake	20.8	5.0	4.2	5.7

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

SNOW SURVEY DATA

AS OF APRIL 1, 1960

WATERSHED XI

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
						LAST YEAR	AVERAGE	
9D1	Camp Senia	7890	3/17	23	5.0	7.0	7.3	15
10E3	Canyon	7500	4/1	32	8.7	15.0	16.0	15
10D7	Cooke City	7400	3/31	20	5.5	9.4	9.5	15
10D5	Crevice Mountain	8400	4/1	18	3.9	8.5	10.5	15
10D4	Devil's Slide	8100	4/2	77	23.0	28.0	21.2	15
10E6	East Entrance	7000	3/31	18	4.8	11.2	13.0	9
10D3	Hood Meadow	6600	4/1	28	7.9	11.4	9.8	15
10D6	Independence	8000	3/16	50	12.2	19.6	20.1	12
10E4	Lake Camp	7850	3/31	28	5.6	9.6	12.8	14
9E1	Lodgepole	8200	3/30	24	6.3	11.8	12.3	13
10E1	Lupine Creek	7300	4/1	23	6.7	9.4	11.9	14
10D1	New World	6700	3/30	30	9.2	13.4	10.6	15
10E2	Norris Basin	7500	3/31	25	6.6	8.5	10.3	12
10C3	Porcupine	6500	4/4	18	5.0	7.3	6.8	15
10D10	Sacajawea	6550	3/24	39	12.5	-	-	-
10E5	Sylvan Pass	7100	3/30	29	8.2	15.9	16.5	14
10E7	Thumb Divide	7900	3/30	43	11.8	19.8	25.8	15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

STATUS OF RESERVOIR STORAGE

March 31, 1960

BASIN & STREAM	RESERVOIR	USABLE CAPACITY 1000 A.F.	USABLE STORAGE - 1000 ACRE FEET			
			1960	1959	1943-57 Average	Yrs.
<u>MISSOURI RIVER BASIN - WYOMING</u>						
Shoshone River	Buffalo Bill	380.3	128.0	13.6	220.6	15
Wind River	Boysen	560.0AC	139.6	100.1	426.7**	5
Wind River	Pilot Butte	31.6	26.0	12.1	18.2	15
Bull Creek	Bull Lake	152.0	36.6	45.5	60.1	15
Belle Fourche	Key Hole	190.0AC	14.8	4.7	11.7**	6
<u>MISSOURI RIVER BASIN - NORTH DAKOTA</u>						
Heart River	Lake Tschida	68.7AC	7.5	78.3	65.3**	7
Heart River	E. A. Patterson	5.6AC	5.9	5.8	5.4**	7
Missouri River	Garrison Lake	18100.0AC	5020.9	3965.9	-	-
James River	Jamestown	220.0AC	10.4	11.4	-	-
<u>MISSOURI RIVER BASIN - SOUTH DAKOTA</u>						
Belle Fourche	Belle Fourche	185.2AC	-	58.2	116.9	15
Cheyenne River	Angostura	90.0AC	-	50.6	47.2**	6
Cheyenne River	Deerfield	15.1AC	-	9.3	13.3**	10
Grand River	Shadehill	84.0AC	-	86.0	81.1**	5
Missouri River	Ft. Randall	3800.0AC	3222.0	2979.0	1736.3**	3
Missouri River	Gavins Point	320.0AC	4027.0	306.4	-	-
Missouri River	Oahe	17000.0AC	-	751.0T	-	-
Cheyenne River	Pactola	55.0AC	-	19.4	-	-

** Average for years of record shown in 1943-57 period.

AC Active Capacity; USBR Billings.

T Total Storage.

WYOMING SNOW SURVEYS ABOUT APRIL 1, 1960

Current Information						Past Record		
No.	Snow Course Name	Elev.	Date of Survey	Snow Depth (In.)	Water Content (In.)	Water Content (In.)		Years Record Used In Average
						Last Year	15-Year Average 1943-57	
<u>LOWER YELLOWSTONE - WIND RIVER</u>								
9F12	Big Warm	8800	3/26	25	7.1	8.9	9.5**	5
9F4	Burroughs Creek	8800	3/28	28	7.8	14.4	15.6**	11
9F10	Dinwoodie	10000	3/29	36	9.2	11.6	13.7**	10
9F9	Dry Creek	9500	3/29	17	4.3	6.8	7.3**	10
9F6	DuNoir	8750	3/26	20	4.9	7.4	10.1	19
9F7	Geyser Creek	8500	3/27	17	3.9	6.6	8.8**	11
9F8	Little Warm	9500	3/27	47	13.7	16.7	18.8**	11
9F14	Sheridan R.S. #2	7500	3/28	18	5.0	6.4	7.3**	5
9F3	T-Cross Ranch	8000	3/28	11	2.9	6.2	8.1	19
#10F9	Togwotee Pass	9600	3/29	74	24.6	32.2	32.1	24
<u>LOWER YELLOWSTONE - POPO AGIE RIVER</u>								
8G2	Blue Ridge	9500	3/23	25	6.9	9.8	13.8	20
8G5	Bruce's Camp	6500	3/24	12	4.3	N.R.		3
9G3	Hobbs Park	10000	3/31	43	12.9	15.7	19.4**	11
9G4	Mosquito Park R.S.	9500	3/31	20	5.7	7.0	8.8**	15
5G1	Sawmill Glade	8500	3/23	25	5.9	9.0	8.6	20
#8G3	South Pass	9000	3/23	37	10.2	11.6	16.4	20
9F11	St. Lawrence R.S.	9000	3/26	13	3.3	6.2	7.6*	16
9G2	Trout Creek	8400	3/31	12	3.2	7.8	6.6**	11
<u>LOWER YELLOWSTONE - OWL CREEK</u>								
+9F19	Kirwin	11000	4/5	55	16.5E			
8F1	Owl Creek	8700	3/29	28	7.8	5.8	5.9**	10
<u>LOWER YELLOWSTONE - GREYBULL RIVER</u>								
+9F19	Kirwin	11000	4/5	55	16.5E			
9F3	Timber Creek #2	8800	3/30	16	4.7	3.6	3.4**	11
9F15	Wood River #2	8000	3/30	22	6.3	5.6	5.7*	17
<u>LOWER YELLOWSTONE - SHOSHONE RIVER</u>								
9E4	Carter Mountain	7800	3/31	18	5.2	4.8		3
#10E6	East Entrance	7000	3/31	18	4.8	11.2	12.8**e	11
+9E5	Ishawooa	9200	4/5	133				
#10E5	Sylvan Pass	7100	3/30	29	8.2	15.9	15.9*	21
10F9	Togwotee Pass	9600	3/29	74	24.6	32.2	32.1	24
+9F18	Younts Peak	8500	4/5	89	31.0E			

* Average is for 15 years of data within and adjacent to the 1943-57 period.

** Average of all past data.

Adjacent drainage.

+ Aerial stadia marker.

e Partial estimate during the 1943-57 base period; E Estimated Water Content.

WYOMING SNOW SURVEYS ABOUT APRIL 1, 1960

Snow Course No. Name Elev.			Current Information			Past Record		Years Record Used In Average
			Date of Survey	Snow Depth (In.)	Water Content (In.)	Water Content (In.)		
						Last Year	15-Year Average 1943-57	
<u>LOWER YELLOWSTONE - NOWOOD CREEK</u>								
#7F1	Bear Trap	8000	3/25	23	6.2			
#7F2	Canyon Creek	7400	3/26	37	10.0			
7E25	Cold Springs Camp	8700	3/24	23	5.8	10.2	8.1**	4
7E24	Medicine Lodge Lake	9500	3/24	38	9.7	13.2	11.7**	4
#7E8	Munkres Pass	9700	4/1	32	8.3	10.4	9.3**	9
#7E27	Onion Gulch	8100	3/25	31	8.3	10.3	9.2**	4
7E7	Tensleep R.S.	8300	3/28	26	7.1	10.2	7.3	22
7E35	Tyrell R.S.	8300	3/28	19	6.5	10.8	8.2**	4
7E26	West Tensleep Lake	9075	3/28	37	9.9	13.9	11.7**	4
<u>LOWER YELLOWSTONE - SHELL CREEK</u>								
7E21	Bald Mountain	9600	3/28	64	20.7	26.4	19.8**	4
#7E20	Beaver Tongue	9200	3/28	59	18.3	25.7	18.8**	4
#7E18	Bone Spring	9200	3/30	55	16.0	21.0	16.9**	4
7E22	Granite Creek Camp	7800	4/1	T	0	5.8	4.3**	4
#7E17	Granite Pass	8950	3/30	52	15.3	21.1	16.6**	4
7E4	Ranger Creek	8800	4/1	25	6.9	11.9	9.0	22
7E23	Shell Creek	9600	4/1	54	13.7	16.6	15.1**	4
<u>LOWER YELLOWSTONE - PORCUPINE CREEK</u>								
7E31	Five Springs Falls	7500	4/1	20	5.4	6.5	5.8**	4
7E30	Medicine Wheel	9000	3/28	50	16.1	23.8	16.0**	4
<u>LOWER YELLOWSTONE - TONGUE RIVER</u>								
#7E20	Beaver Tongue	9200	3/28	59	18.3	25.7	18.8**	4
7E32	Big Goose #2	7700	4/2	26	6.3	10.4	7.9**	4
#7E18	Bone Spring	9200	3/30	55	16.0	21.0	16.9**	4
7E33	Burgess R.S. #2	7900	3/29	30	7.9	11.3	7.8**	4
7E34	Dome Lake #2	8800	4/2	39	9.7	11.6	10.0**e	4
7E14	Gloom Creek	9300	3/31	51	14.8	17.0	12.9**	4
#7E17	Granite Pass	8950	3/30	52	15.3	21.1	16.6**	4
7E11	Sibley Lake	8000	3/31	37	9.0	14.5	10.0**	4
7E12	Sucker Creek	9000	3/31	45	12.4	16.2	12.0**	4
7E10	Steamboat Point	7500	3/31	26	7.6	12.3	7.8**	4
7E13	Wood Rock G.S.	8500	3/29	39	10.6	14.0	10.9**	4
<u>LOWER YELLOWSTONE - POWDER RIVER</u>								
#7F1	Bear Trap	8000	3/25	23	6.2			
#7F2	Canyon Creek	7400	3/26	37	10.0			
+7E36	Cloud's Peak	10000	4/5	57	17.0E			
#7E28	Muddy Creek G.S.	7800	4/1	15	2.4	4.8	4.5**	4
#7E8	Munkres Pass	9700	4/1	32	8.3	10.4	9.3**e	9
#7E27	Onion Gulch	8100	3/25	31	8.3	10.3	9.2**	4
8E5	Soldier Park	8700	3/31	20	5.6	8.6	5.8**	8
7E6	Sour Dough	8500	3/31	24	4.7	8.1	7.3	23

** Average of all past data.

Adjacent drainage; + Aerial stadia marker.

e Partial estimate during the 1943-57 base period; E Estimated Water Content.

Agencies Cooperating in Collecting Data Contained
in this Bulletin

U. S. Forest Service
Region I, Missoula, Montana

U. S. Geological Survey
Helena, Montana

U. S. Army Corps of Engineers
Portland, Oregon
Seattle, Washington
Omaha, Nebraska
Riverdale, N. D.

U. S. Indian Irrigation Service
St. Ignatius, Montana

U. S. Weather Bureau
Helena, Montana

U. S. Fish & Wildlife Service
Red Rock Lakes Refuge
Monida, Montana

U. S. Bureau of Reclamation
Billings, Montana
Boise, Idaho

Montana Power Company
Butte, Montana

Agricultural Experiment Station
North Montana Branch Station
Havre, Montana

Montana State Highway Dept.
East Glacier, Montana

National Park Service
Yellowstone National Park
Glacier National Park

Montana Experiment Station
Montana State College
Bozeman, Montana

Bonneville Power Administration
Portland, Oregon

Montana State School of Forestry
Montana State University
Missoula, Montana

Soil Conservation Service
Montana, Wyoming, Idaho

Soil Conservation Districts
Montana Counties

Johnson Flying Service, Inc.
Missoula, Montana

Water Rights Branch
Dept. of Lands & Forests
Victoria, British Columbia

Department of Northern Affairs
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COOPERATIVE SNOW SURVEYS

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necessary for forecasting
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supply, hydro-electric power
generation, navigation,
mining and industry

*"The Conservation of Water begins
with the Snow Survey"*